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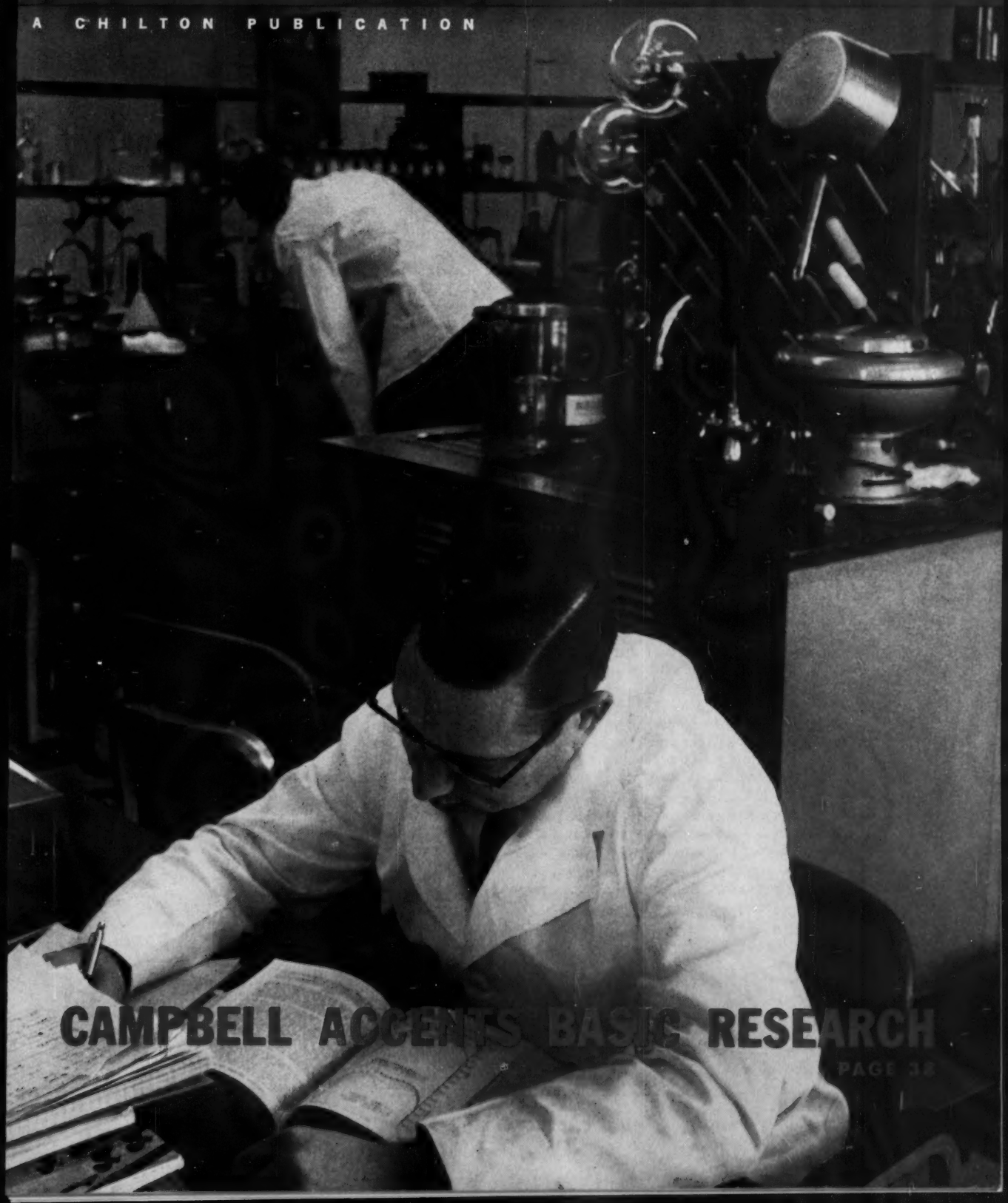
FOOD ENGINEERING

FOR BETTER MANAGEMENT IN MANUFACTURING

A CHILTON PUBLICATION



CAMPBELL ACCENTS BASIC RESEARCH

PAGE 38

How *Sterwin* Puts More Profit Into Food Products!

If your food product requires enrichment, color, flavor...then STERWIN can help you save time, money, labor . . . so give you more profit.

For STERWIN offers unique extras in vitamins, colors, vanillin, and these superior ingredients are fitted into your production picture by experts with years of practical and technical experience. These STERWIN Technically Trained Representatives have cut time, expense, production steps for manufacturers producing a widely varied range of food products: candy, bread, margarine, soda, fruit juice, cereals . . . to name just a few.

STERWIN ingredients are delivered when you want them, in the quantity you need. Keeping delivery promises is a STERWIN tradition that helps keep your production at top efficiency.

For new production set-ups or to improve an existing one . . . see your local STERWIN Representative . . . costs you nothing . . . can profit you plenty.

You get these extras when you buy:

STERWIN VITAMINS . . . *the most complete line* in the field . . . immediate delivery in any quantity.

STERWIN COLORS . . . Parakeet Certified F.D.&C. . . . backed by a *highly experienced technical staff* to help you with your color problems.

STERWIN VANILLIN . . . pure, ZIMCO® U.S.P. Vanillin . . . *unlimited supply* of basic material from world's largest vanillin producer.

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Subsidiary of Sterling Drug Inc.

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FOOD

FOR BETTER MANAGEMENT IN MANUFACTURING

A CHILTON PUBLICATION
VOL. 33 NO. 3

March, 1961

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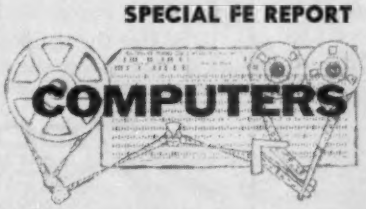
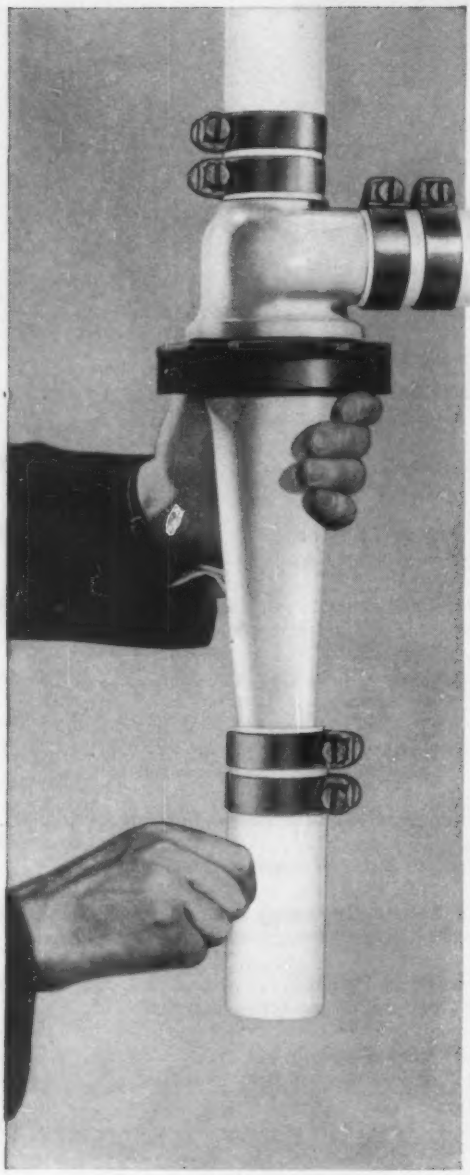


Computers can speed, simplify, and cut the cost of many of your basic operations—accounting, sales analysis, process and inventory control, etc. Here are the various types of machines and how they are being used.—p. 63.



P-50A

DorrClone®

REMOVES SEEDS AND SPECKS FROM JUICES

...Automatically, without moving parts!

The DorrClone P-50A is a simple, cyclone-type separator that may be fitted to any transfer piping system handling several of the popular fruit juices. Installation is easier than putting in a valve. It operates on the centrifugal principle—feed entering the upper section is given a whirling motion that causes embryonic seeds, specks and other foreign matter to be thrown to the walls of a conical chamber and fall downwards to the discharge valve at the bottom while the pure juice flows continuously through the top outlet.

There are no moving parts—pump pressure in the transfer line does the work. Unit is sanitary one-piece porcelain construction — unaffected by fruit acids and cannot impart taste or odors. Capacity varies with pressure — from 7½ gallons per minute at 7.5 psi to 30 GPM at 80 psi. Multiple units can be used where higher capacities are required. Underflow consistency can be regulated by adjusting the discharge valve.

So simple and low in cost you'll want to order one for a trial installation!

Several well-known processors of citrus and other juices have been so impressed with the possibilities offered by the P-50A DorrClone that they have ordered and installed units on an experimental basis. Results have been so good that repeat orders have followed. Units are shipped complete with flanged metal collar for mounting purposes and Brewery Hose connections. Price is $160.00 f.o.b. your plant anywhere in the U. S. Use the coupon or send your regular purchase order.

Dorr-Oliver Incorporated
Stamford, Connecticut

Attn: D. C. Gillespie, Sales Manager
We're interested in trying a P-50A DorrClone on our juice transfer lines.

- ☐ Check for $160.00 enclosed
- ☐ Bill us and ship
- ☐ Send more details. We are processing____gpm of _____ juice.

Name_____

Company_____

Address_____

_____

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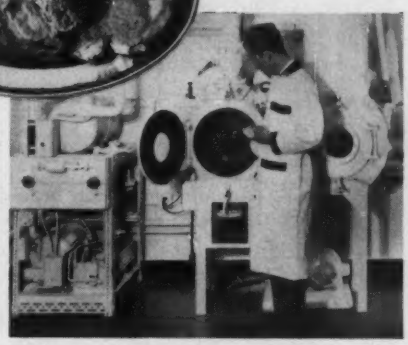
How NRC can help you with FREEZE DRYING of YOUR PRODUCT

Take Advantage of Newly Improved Processing

. . . Save Research and Development Time and Costs

Whether you process perishables, heat sensitive foods, meats, pet foods, pharmaceuticals or milk, NRC has a wealth of experience that can mean definite savings to you in research and development time.



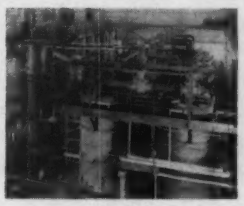
Here's How:

1. ***Determine the appetite appeal.*** NRC has a fully-equipped Freeze Drying Laboratory available on a contract basis to serve you. At NRC a preliminary product analysis is made to decide if freeze drying is practical for you. An estimate can be made of anticipated capital investment and processing costs. *This method entails no capital investment by you.*

2. ***Install a pilot plant for your experimentation.*** A Freeze Drying laboratory can be set up at your plant together with all the technical help you need to get started.

3. ***Build and install a complete production facility.*** NRC designs and builds a freeze dehydration production facility for your plant.

Lederle Laboratories



Minute Maid Plant

Eli Lilly Plant

Whatever stage you have reached in your thinking or planning about freeze drying, it will pay you to talk with us. NRC developed frozen orange juice concentrate . . . designed and built 90% of the world's penicillin production facilities . . . can give *you* all the help you need.

Call or write us stating your needs, and we can arrange a meeting.

A Subsidiary of National Research Corporation
160 Charlemont Street, Dept. 36C
Newton 61, Massachusetts

NRC
EQUIPMENT CORPORATION

IT'S THE FMC PRINCIPLE THAT COUNTS

Actual comparison testing proves that M&S Positive Displacement Type Fillers provide the most profitable combination of the four "most wanted" filler features:

1. High Accuracy. Exclusive FMC premeasuring principle insures consistent close-tolerance filling for higher case yield per batch on all types of products.

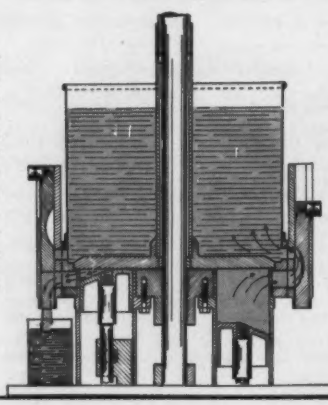
2. Low Maintenance. Rugged construction and precision engineering of M&S Fillers assure long life and dependability under the toughest, heaviest production schedules.

3. High Speed Operation. The M & S line includes fillers in every speed range—equalling the speed of latest cappers and closing machines—with no sacrifice in accuracy. The new, exclusive FMC "No can—No fill" mechanism for each valve, is now available for high speed operations.

4. Sanitary by Design. Available in stainless and non-corrosive type contact materials to meet your specific needs. Quickly dismantled for easy cleaning.

Your FMC representative will gladly show you which M&S Filler Model is best suited for your product. Won't you call him today?

With FMC—M&S Plunger Fillers you get the time-proven principle of unrestricted *product premeasurement* and *positive injection* into containers by *precision pistons*. No other filling principle offers such a high degree of accuracy. Compare—feature for feature — see why M&S has been the "Standard of the filling industry" for more than 70 years.



M&S 12 Pocket Filler at Bercut-Richard's Sacramento, California plant, filling paste in No. 10 cans at 72 cpm.

Putting Ideas to Work

FOOD MACHINERY AND CHEMICAL CORPORATION

Canning Machinery Division

General Sales Offices:

WESTERN: SAN JOSE, CALIF. • EASTERN: HOOPESTON, ILL.

TRENDS & FORECASTS

By 1970 demand for red meat will increase 37%; poultry, 25%; fruits and vegetables, 36%; feed grains, 40%. These are predictions by R. B. Tootell, Farm Credit Administration.

Sales in retail food stores were running 5% higher in November '60 than year earlier to total $4.6 million, Bureau of Census reports. Business of eating places was 3% higher, or $1.35 million.

Typical food manufacturing trends are revealed in '58 Census of Manufactures for macaroni and spaghetti. Compared to '54: Capital expenditures were up 114% to $5.3 million, achieving 5.8% reduction in man-hours and holding increase in wages paid to 13.6%. At same time, value added was boosted 27.6% to $67.1 million.

Meat processed and customers served by frozen locker plants increased 50% in decade, says Farmer Cooperative Service. In '59, nearly 9,900 firms processed 1.8 billion lb. of food and served 6.4 million families.

Canned meat consumption jumped 64% from '49 to '59, while total meat gained 30%, according to National Meat Canners Assn. More than 2 billion cans and large number of glass jars were packed in '60.

Amount of carbonated beverages in tin cans rose 157% to 800 million containers between '56 and '60, says American Iron & Steel Inst.

Already handling 60% of 6-oz. frozen orange juice concentrate in Florida, aluminum can next will be used in big way for seafoods and specialty meats. So predicts Reynolds Metals.

Fresh apple consumption dropped 26% per capita, but demand for apple sauce increased 111% from '49 to '59, Processed Apples Institute reports. Juice is up 161%; apple slices, (not frozen), 34%.

In last half of '60, popcorn sales were 21.8% higher than year earlier. So reports Popcorn Institute, which has been intensifying advertising.

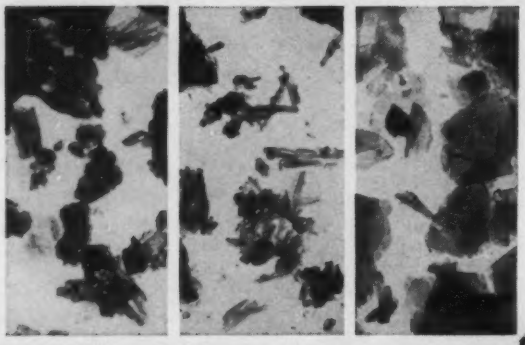
Fish portions gained 31% to 34.2 million lb. in first 9 months of '60, Bureau of Fisheries reports. Fish sticks were up 4% to 46.7 million lb.

Poultry used in processing rose 40% to 404 million lb. last year, USDA reports. One-fourth of volume represented turkeys.

Gains in canned vegetable packs reported by NCA for '60 include: Carrots, 42% to 3.8 million cases; mixed vegetables, 19% to 2.35 million cases. Declines reported: Succotash, off 10.8% to 344,627; beets, 10.7% to 7.45 million; peas and carrots, 1.9% to 1.7 million.

Electron micrographs of Micro-Cel A, C and E show particle structures ideal for food applications.

1μ



Micro-Cel helps keep food mixes bone dry!

Micro-Cel®, Johns-Manville's new synthetic calcium silicates, answers caking problems. Highly absorbent, it remains a free-flowing powder after absorbing triple its weight. High bulk (4½ lbs. to a cu. ft.), irregular particle shape and high surface area, make it ideal for coating sticky and hygroscopic particles. Micro-Cel gives low cost per pound-volume. To keep food mixes free-flowing, even under the worst conditions, try Micro-Cel. For information, samples and assistance, mail coupon below!

JOHNS-MANVILLE
Celite Division

1961

JOHNS-MANVILLE, Box 14, New York 16, N. Y.
In Canada: Port Credit, Ontario.

☐ Please send additional data.

☐ Please send free sample of suitable grade of Micro-Cel for use in:_____

☐ Have local Sales Engineer contact me.

Name_____ Position_____

Company_____

Address_____

City_____ Zone____ County_____ State____

Celite Division synthetic silicates used as anti-caking agents up to 2% are not considered food additives as defined by FD&C Act Amended, Section 201(s).

Schedule of Events

March

9-10—Dairy Suppliers Equippers, meeting, Barbizon Plaza Hotel, NYC.
12-15—Nat'l American Wholesale Grocers' Assn., meeting, Palmer House, Chicago.
20-23—15th Nat'l Conference on Handling Perishable Agricultural Commodities, Purdue Univ., Lafayette, Ind.
26-30—Nat'l Assn. of Refrigerated Warehouses & The Refrigeration Research Foundation, joint meeting, San Francisco.

April

6-12—U. S. Wholesale Grocers' Assn., meeting, Americana Hotel, Bal Harbour, Fla.
9-13—American Assn. of Cereal Chemists, meeting, Baker Hotel, Dallas, Tex.
9-13—American Industrial Hygiene Conference, Sheraton-Cadillac Hotel, Detroit.
10-13—National Packaging Exposition, Lakefront Exposition Hall, Chicago.
15-18—National Fisheries Institute, meeting, Shoreham Hotel, Wash., D. C.
30-M4—American Society of Brewing Chemists, meeting, Granada Hotel, San Antonio, Tex.

HORS D'OEUVRES

The caffeine in one cup of coffee partially blocks the effect of a second cup for about 3 hours, reports University of Michigan Medical Center. So there's a limit to the lifts you can get, even from coffee.

USDA reports that a relatively high percentage of those who do not eat eggs regularly simply do not like eggs. What will they discover next?

Russia evidently plans to dump part of its Cuban sugar purchases at depressed prices, killing Cuban sales in many markets. Who's weeping?

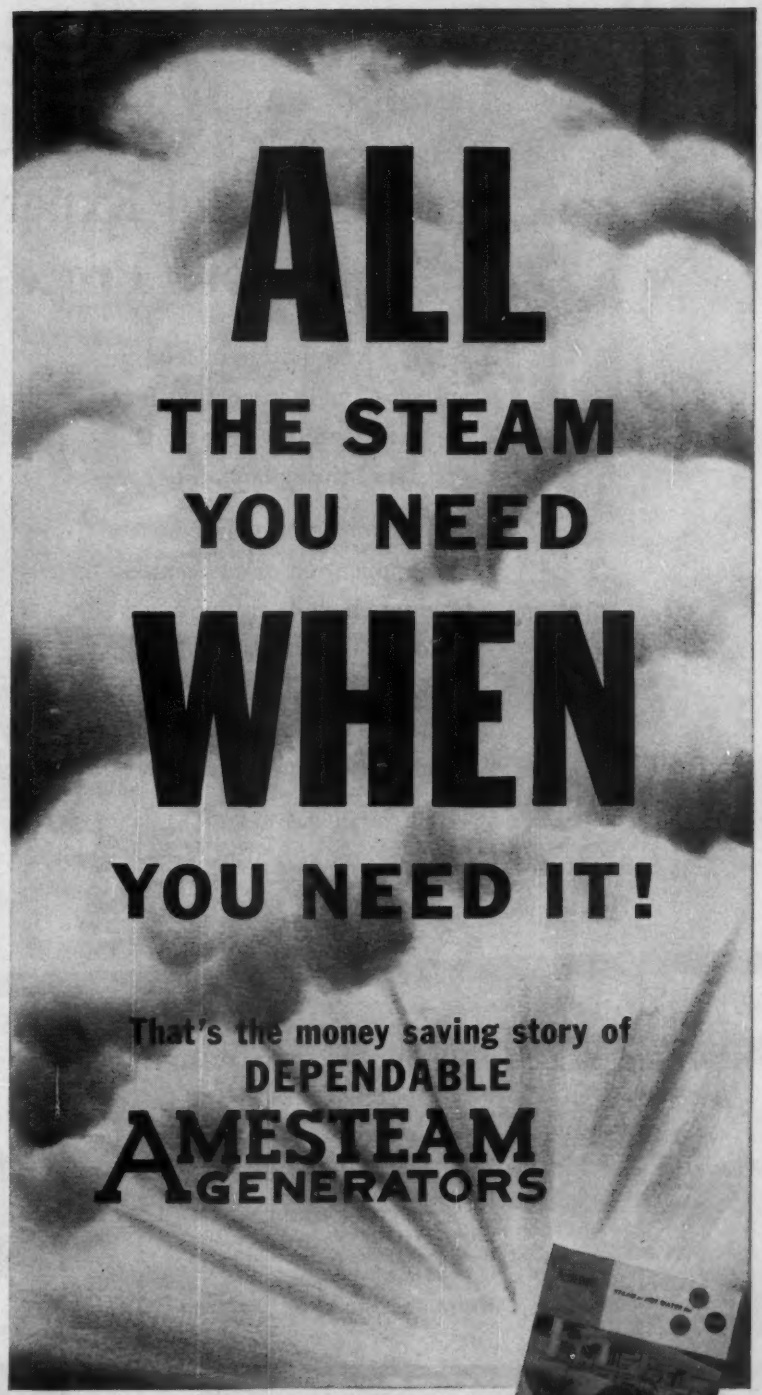
Researchers reveal that chickens lay most of their eggs in the morning. Same goes for business men with hangovers.

The electric eye has been outwitted. Brewery employees mixed other objects in with returning cases of empty bottles to up the count—at 75 cents per case. Wanted: photocell counter with built-in burglar alarm.

Government forecasts no drop in number of babies this year. Previously there had been uneasiness over prospective baby crop. Not an uncommon phenomenon.

Made from defatted, dehydrated nuts, peanut flour is used to control hemophilia. Takes 3 lb. daily per patient, indefinitely. Potential users are put at million. What our industry needs are more pharmaceutical foods.

New insecticide developed by American Snuff smelled so bad it drove flies away before they could be poisoned by it. So strawberry scent was added. Flies can't resist it. Kind of kiss of death.



Write today for this helpful bulletin
"Steam or Hot Water for Power, Heat, Process"

AMES IRON WORKS, INC.

BOX B-31 OSWEGO, NEW YORK

TRI-CLOVER

Products and Experience can help Automate your Processing Operations

Automation of food processing operations is becoming an increasingly important factor in determining over-all production capacity, and can be a contributing factor in the profit "picture" throughout the food industry.

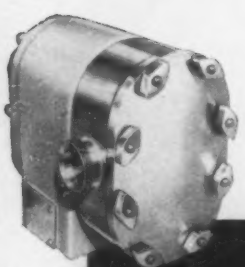
Tri-Clover Division has been actively engaged in the development and application of automated flow control systems. Established products have been improved and new products have been added to help bring production flow under positive control. And, complete facilities for the design, engineering and plant layout assistance needed to help you process the most product per man-hour expended are now available to you.

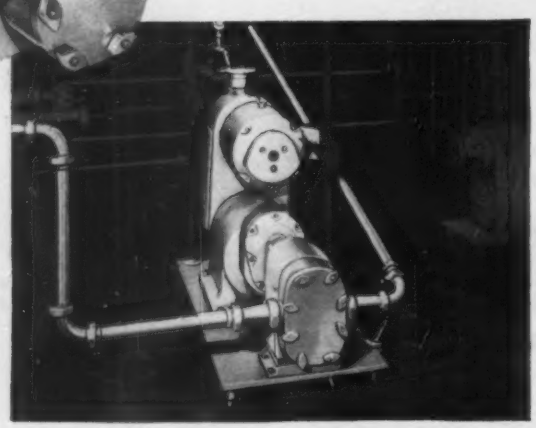
Write for further details.

NEW "PR" SERIES POSITIVE ROTARY PUMPS

This new high-efficiency series offers many exclusive features, including: FLOATING IMPELLER DESIGN; UNIQUE STATIC O-RING SEAL . . . FULLY ACCESSIBLE; RE-USABLE O-RING COVER GASKET; SEPARATE COMPARTMENT FOR OIL-LUBRICATED GEARS . . . and a popular size range including capacities of 3, 10, 25, 60, 125 and 300 gpm.

WRITE FOR BULLETIN "PR 260"

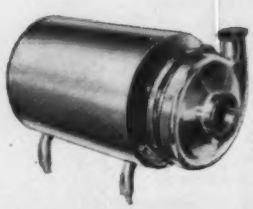


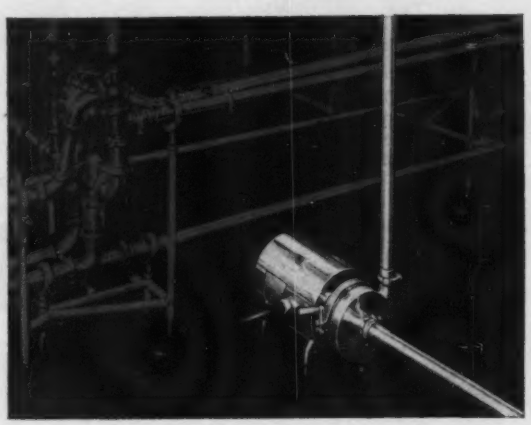


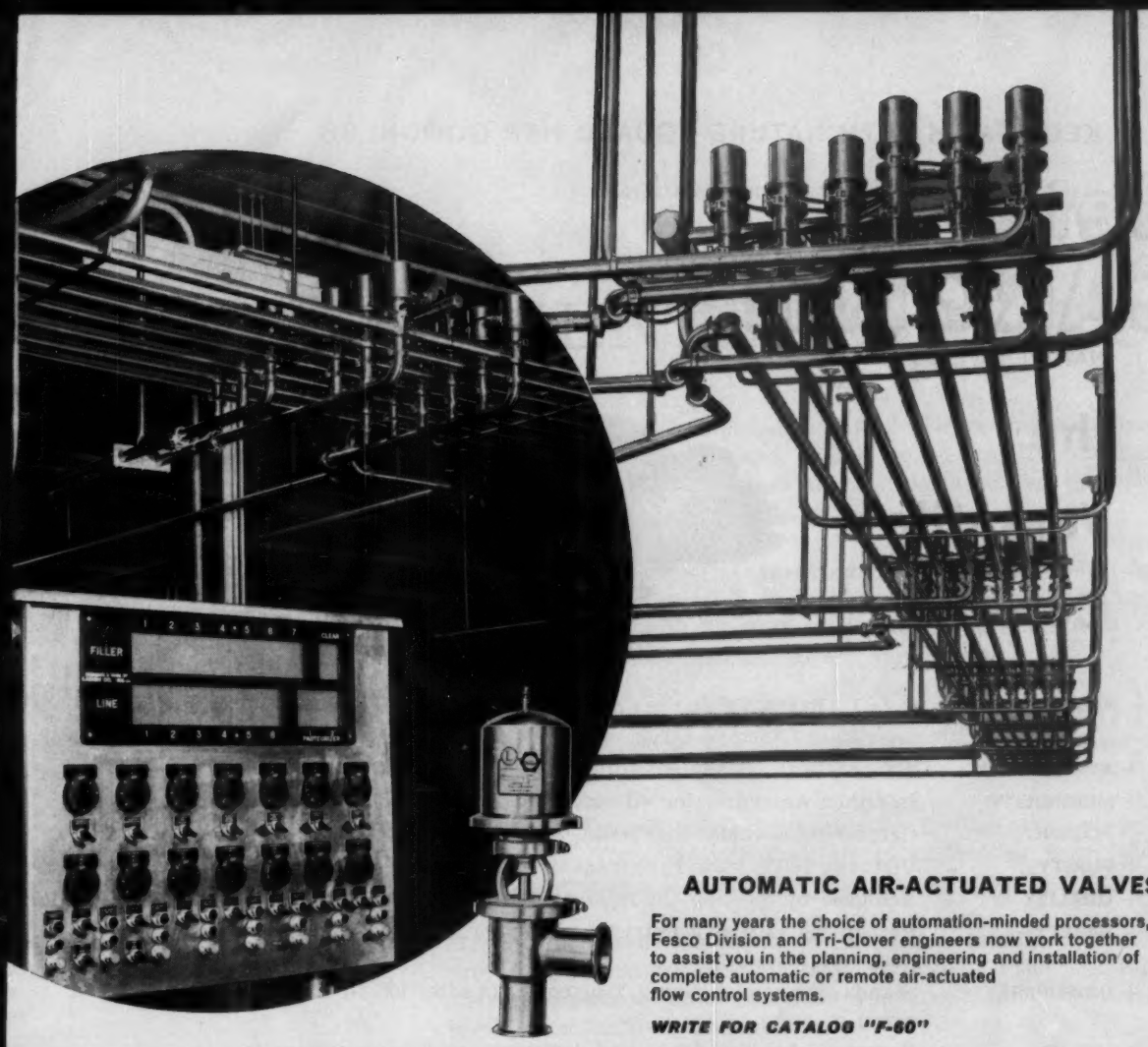
NEW "CIP" PUMP

This Tri-Clover Centrifugal Pump combines clean-in-place convenience with the efficiency of a fully developed volute-type head, one piece impeller and shaft, and one piece internal seal. It's a new concept in sanitary centrifugal pumps aimed at continuous "CIP" service.

WRITE FOR BULLETIN "CIP 260"





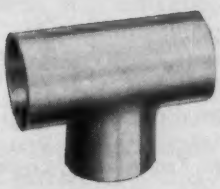


AUTOMATIC AIR-ACTUATED VALVES

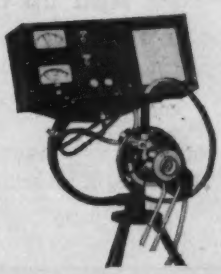
For many years the choice of automation-minded processors, Fesco Division and Tri-Clover engineers now work together to assist you in the planning, engineering and installation of complete automatic or remote air-actuated flow control systems.

WRITE FOR CATALOG "F-60"

"TRI-CLAMP" Fittings



"TRI-WELD" Fittings



"TRI-WELDER" Portable Welding Unit

AUTOMATION-ENGINEERED FITTINGS

A continuing program of product development and improvement has resulted in expansion of the Tri-Clover line of plug valves, sanitary stainless steel tubing, fittings and centrifugal pumps. Snap action TRI-CLAMP® take-down fittings, TRI-WELD® welded fittings and the TRI-WELDER® are fast becoming major cost reduction factors throughout the food industry.

WRITE FOR LITERATURE

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Tri-Clover Division
Kenosha Wisconsin

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Cable TRICLO, CHICAGO

6361.

CIRCLE 11 ON INQUIRY CARD

KEEP FAITH WITH NATURE—GUARD HER GOODNESS

Beta CAROTENE

'NATURE'S YELLOW'

the Versatile Color

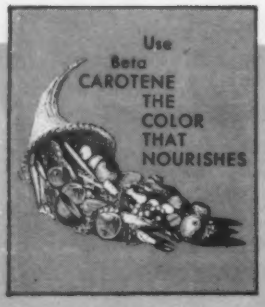
RECOGNIZED
SAFE AS A NUTRIENT—SAFE AS A COLOR

ACTIVITY	*Beta CAROTENE is the Color that Nourishes. Its vitamin A activity is 1,666,666 U.S.P. units per gram.*
+ **AVAILABILITY**	Six practical, convenient forms for every food use.
+ **MISCIBILITY**	In either water-base or oil-base foods.
+ **POTENCY**	Greater color values that count, from a small amount.
+ **PURITY**	Virtually 100% pure. Free from useless extractives or residues.
+ **QUALITY**	Achieved by meeting the most exacting specifications.
+ **SAFETY**	Recognized safe as a nutrient. Accepted in U.S.A. and many other countries.
+ **UNIFORMITY**	Standardized, unchanging, true color, lot after lot. No tinge of green or red.
+ **UTILITY**	Recommended for foods and beverages requiring yellow to orange color.

Add up to *versatility* for Beta CAROTENE
the Color that Nourishes

USE IT FOR
Margarine • Shortening
Salad and Cooking Oils
Mellorine & Ice Cream Products
Pie Crust & Cake Mixes
Baked Goods • Frozen Foods
Fruit Drinks, Fruit Juices & Concentrates
Puddings & Egg Yolk Products
Gelatine Desserts • Confections
Dessert Toppings • Popcorn
Cheese • Soups • Creamed Foods

Send for samples and technical literature.



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FINE CHEMICALS DIVISION **HOFFMANN-LA ROCHE INC.**
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DEVELOPMENTS TO WATCH

Campbell Soup has completed new food science and nutrition labs occupying 39,000 sq. ft., and staffed by 90 scientists, technicians and assistants. Basic research will be expanded "so that product research will not stagnate."

Instant egg powder is in experimental production. Whole eggs are blended with concentrated skim milk and vegetable oil. Blend is pasteurized at 140F. Then it is deaerated, injected with steam, vacuumized, homogenized, cooled and spray dried.

New process freeze-concentrates vinegar for use in processed foods. Product is continuously slush-frozen to 17F. then centrifuged to remove ice.

Irish Sugar Co. will freeze-dry vegetables for domestic consumption and export. Tests indicate shelf-life is as long as 2 yr. Vickers-Armstrong drier will be used.

Market for fresh fish would be expanded greatly by radiation processing to extend shelf-life, says Bureau of Fisheries. Big disadvantage seen is initial consumer resistance. Radiation cost of 1¢ per lb. is considered acceptable.

Fast new sedimentation test for bread-baking qualities of wheat has been developed by USDA. Flour is mixed with water, lactic acid and isopropyl alcohol. After settling, sediment is read on scale.

Apple firms in Washington State can save 4½¢ per bag, USDA finds. This is done by shipping in large pallet containers and bagging at terminal market.

Water is purified or desalted in wiped-film evaporator in General Electric experiments. Slowly revolving blades spread water 0.001 in. thin on surface of evaporator tube.

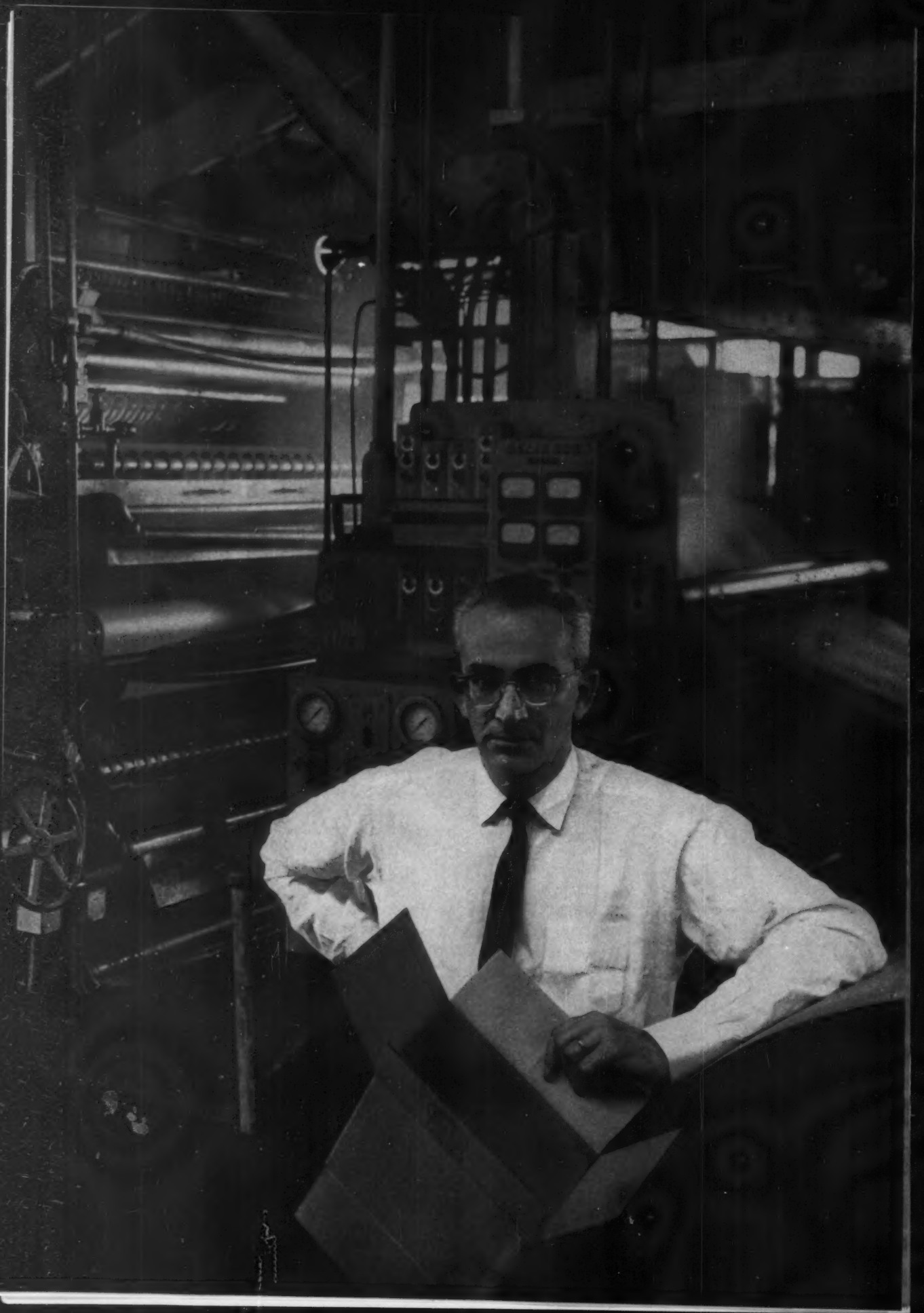
Development of mechanical methods for harvesting fruits and vegetables is great cost-cutting challenge. Tomato harvester demonstrated by University of California may cut labor 80%. Special tomato for mechanical harvesting has been developed.

Expected to become commercially important, speckled butter beans were frozen to the extent of 20 million lb. last season.

New spiral-wound aluminum foil and fibreboard can is being used by Hood for frozen concentrated orange juice. Savings of 20% compared with conventional 6-oz. tinplate can are reported. Freight savings of 4 to 10% are claimed.

See Who's Building What p. 17

Washington Report p. 21



With him, every case is special

Over a thousand companies have put the construction of their corrugated boxes in Metin Hamarat's hands.

METIN HAMARAT is manager of all Union-Camp corrugated box plants. The shipping containers these plants produce are used by virtually *every* manufacturing industry in the country.

There's a good reason for this wide acceptance. Metin, you see, is a perfectionist. Although making corrugated boxes is a mass production business, he refuses to compromise with quality.

Why this passion for precision when most corrugated boxes look alike? The answer lies in the myriad of unapparent features that contribute to the performance or quality in a corrugated box.

For instance, consider the combining of the sheet itself—the corrugated "sandwich". Even the *quantity* of adhesive used in this operation is critical. Skimp, even slightly, and the sheet might peel apart later. Use too much adhesive and you often get an unsightly washboard effect that can spoil the appearance of your printing. And, as you might expect, Metin and his pressmen take particular pride in corrugated box printing. So much so, that they frequently *sign* their work!

Scoring is critical, too. Just being *straight* isn't enough. Too deep a score, as Metin points out, weakens the board and makes it prone to tear. Too narrow, or shallow, will make the box hard to fold—cause foul-ups on the packaging production line. And, of course, costly downtime.

And, there's *slotting*—the knife-cuts that form the top and bottom box flaps. Metin is meticulous here, as well. If you've ever tried to close and seal a carton whose flaps didn't meet perfectly or exactly parallel to each other, you'll understand why.

Attention to these and other key steps in the manufacture of Union-Camp corrugated boxes are the reasons they pay off in performance on your packaging line. That's why with Metin Hamarat, every case is special.

His craftsmanship manifests itself in the quality of products produced in *all* Union-Camp box plants. It typifies the thoroughness of Union-Camp's packaging service. This service covers corrugated box development and design. It includes specifications control, art and merchandising counsel and plant surveys of your materials handling operation.

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Combining the non-contaminating properties of stainless steel . . . the flexibility of rubber . . . the clearness of glass . . . and the toughness of leather, Tygon plastic Tubing, Formulation B44-3, has no peer in food handling applications.

Completely odorless, tasteless and non-toxic, Tygon B44-3 is safe for use with even the most flavor-sensitive foods and beverages.* With a surface smoothness far greater than that of either rubber or stainless steel, Tygon will not trap minute food particles which foster bacterial growth. Tygon can be quickly cleaned, is unaffected by all common cleaning agents, and can be sterilized with steam (open-end flushing) or bactericides.

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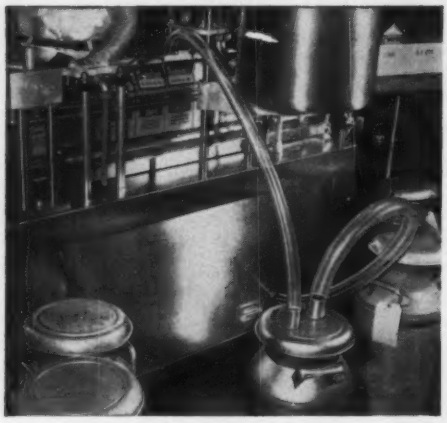
**For processed milk and milk products, use Formulation B44-4*



Compare the unique advantages of Tygon B44-3 with any other piping medium and you'll see why more and more bottlers and food processors are standardizing on Tygon. Write for your free copy of informative Bulletin T-100 . . . today!

Plastics and Synthetics Division

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416F-1

Who's Building What ...

Monthly Reports: These food firms will spend or plan to spend $34,867,800 for expansion.

Contracts Awarded

Borden Co., Dayton, O., milk and ice cream plant, $1,200,000.

Godfrey Co., West Allis, Wis., bakery, $500,000.

Hui Aina, Inc., Honolulu, Hawaii, bakery, $403,000.

Hunt Foods Co., Fullerton, Calif., warehouse, $1,174,800.

Morton Frozen Food Products, Inc., Crozet, Va., storage plant, $500,000.

Schaake Packing Co., Seattle, Wash., meat packing plant, $110,000.

Southern Bakeries, Atlanta, Ga., distribution center, $1,000,000.

Proposed Projects

American Foods, Inc., Burgaw, N. C., vegetable processing and packing plant, $125,000.

Armour & Co., Kankakee, Ill., plant, $6,500,000.

Associated Grocers, Inc., Greenville, S. C., warehouse and office, $300,000.

Beatrice Foods, Inc., Honolulu, Hawaii, processing plant, $2,000,000.

Best Ever Ice Cream Co., Hampton, Va., ice cream plant, $125,000.

California Packing Co., Swedesboro, N. J., plant and office, $175,000.

Carling Brewing Co., Fort Worth, Tex., brewery, $20,000,000.

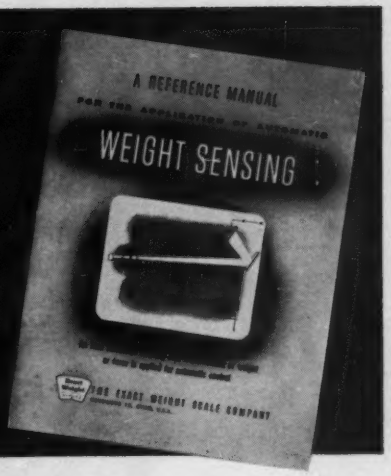
H & B Packing Co., Waco, Tex., packing plant addn., $115,000.

H. P. Hood & Sons, Manchester, N. H., milk processing plant, $115,000.

Smithfield Meat Processors, Inc., Smithfield, N. C., meat processing plant, $400,000.

Stokley-Van Camp Canning Co., Essex, Ont., plant addn., $125,000.

SEND FOR THIS NEW FREE MANUAL



It shows you how measurement of weight or force is applied for AUTOMATIC CONTROL

It's FREE! No obligation

This valuable new reference manual, packed with explanatory diagrams, presents many control possibilities offered by a proven weight-sensing principle. It shows how the principle is applied for control of basic operative functions in automated machines; for control of processing equipment; and for quality control operations. Here is a source of ideas that can lead to the solution of problems concerned with weighing or control by weights. Write for your free copy of "Weight Sensing."

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CIRCLE 17 ON INQUIRY CARD

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why you should see your **AUTOMATIC**® *Dealer...*

New center-control stand-up model maneuvers in tight areas

Now you can have the dependability and performance of AUTOMATIC trucks in a new compact, convenient center-controlled model. Operator of new Model FFC stands on a platform ahead of the battery. Getting on or off is easy from either side, and he enjoys maximum safety and visibility; even high-type batteries can be substituted without blocking vision. Using one lever, operator can lift and tilt load at same time, or control each function independently.

Compact, easy to maneuver, ideally suited for congested areas, the new Model FFC not only offers the greater economy of electric drive over straight gas, but means clean, fume-free operation and low maintenance. AUTOMATIC's own Class H motors last longer because they're protected from burnout by special silicone insulation. Available in 2,000 and 3,000-lb. capacities.

Model FFC is in good company. It joins one of the broadest lines of lift trucks in the industry. With this broad line, your AUTOMATIC Dealer can give you professional, *unbiased* advice on materials handling. Call him. **WRITE TODAY FOR BULLETIN ON NEW MODEL FFC TRUCK.**

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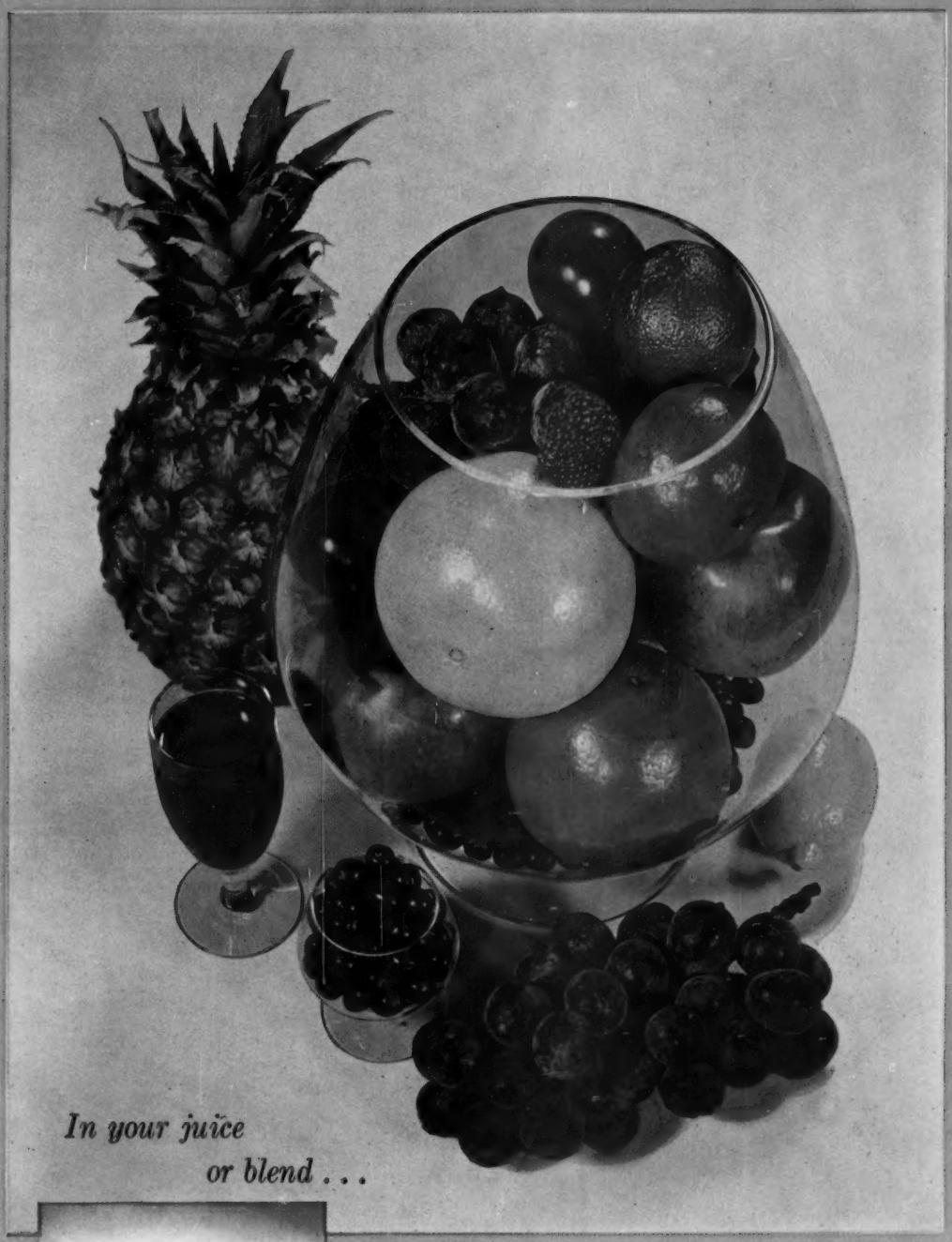
Keep Faith with Nature—Guard her Goodness



In your juice or blend . . .

STANDARDIZE—*don't jeopardize*

Nature never standardizes the vitamin C content of fruits. Nature's never uniform. Uniformity varies. So *standardize*—don't jeopardize—juice uniformity!

Standardize on juice excellence, with Roche® vitamin C (ascorbic acid). Capitalize on quality. Give fruit juices and blends: acceptable vitamin C levels, ripe-fruit-flavor richness, a nutritional claim for your labels.

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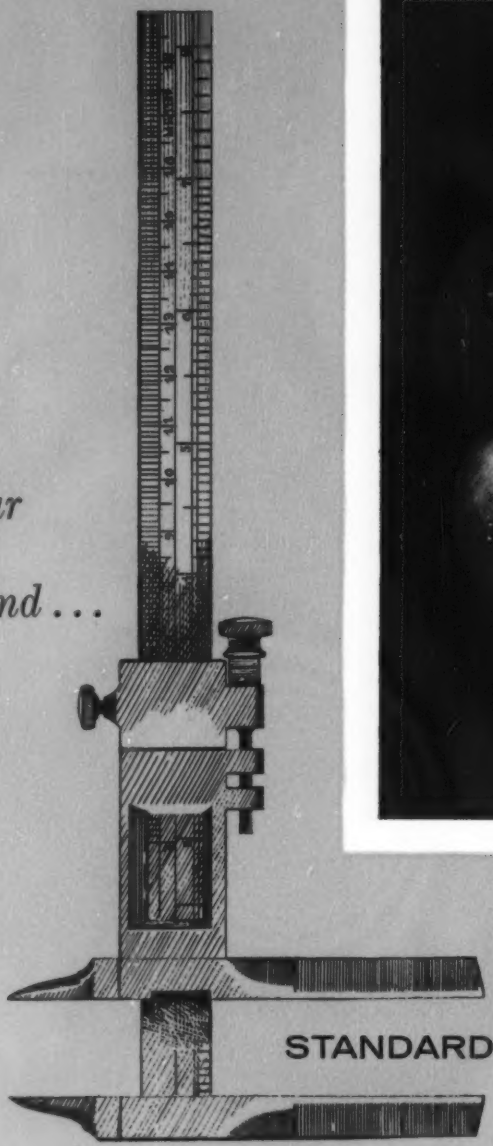
Keep Faith With Nature—Guard Her Goodness

In your juice or blend . . .



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Washington Report

Unions eye food plants . . . A wheat shortage? . . . New merger tack

W-H Bill Ups Coverage, Cuts Exempts

Administration's proposed changes in wages and hours standards hits the food industry on four fronts. Main goal, of course, is to lift present $1/hr. minimum pay to $1.20 in '62, $1.25 in '63. But proposals will also:

► **Greatly expand coverage** by making Fair Labor Standards Act apply to "enterprises" (grossing over $250,000) instead of "employee" as in present law. This means that all workers, not just those engaged in a plant's interstate commerce, would be included.

► **Spark upward thrust of wage minimums** as unions will try to preserve existing pay differentials.

► **Cut processors' present 28 weeks exemption to 20 weeks.**

With both parties committed to some form of higher wages, new minimums are inevitable. There is some talk, though, of postponing a new law until '62—an election year. But House Labor Committee Chrmn. Powell hopes to have a bill by Easter.

FDA Seeks Bigger Net

Former HEW Secretary Flemming, in one of his last official acts, asked Congress to give FDA stronger inspection authority. Specifically, he urged that (1) factory investigations embrace "all records, files, papers, processes, controls, and facilities" related to violations, and (2) that consulting labs be included under inspection provisions.

Meanwhile, it was learned that outcome of FDA's scrap with ice cream makers is several months off. Court test, set for West Coast, won't start until this summer or early fall.

Union Combine Readies Food Drive

New 1-million-member super-union of food and beverage workers was formally set up by AFL-CIO last month. Known as Food & Beverage Trades Dept., it embraces 10 unions.

"By May, we'll be ready to start an aggressive organizing drive," one AFL-CIO official says. "We need that much time to set up the formal organization. Then we'll pick our first targets, put everything we've got into an organizing drive."

Bakers' Poverty Amidst Plenty

USDA is under sharp pressure to ease the supply-pinch on Soft Red wheat users. Rising exports—from 30 mill. bu. in '58 to estimated '60 mill. for fiscal '61—are drawing off much of the available supply. To aggravate the shortage still more, Congress talks of trimming the number of exempt acres of Soft Red.

As a result, biscuit, cracker, and cake bakers are forced to scramble for "perilously short supplies." Says a baked goods official, "If the government would slow down its exports, situation would adjust itself."

A-B Finds No Takers

Selling a brewery isn't easy. Anheuser-Busch, forced by Justice Dept. order to dispose of its Regal plant in Miami, has many offers but few qualified takers. Catch, of course, is the difficulty in getting a brewing license. Recognizing this, government has advised unofficially that it is willing to "look the other way" for a time.

Industry Marriages Take New Turn

Federal antitrusters are busy studying implications of new-style diversification—buying of unrelated processors within the same basic industry. Bakeries no longer tend to buy other bakeries; they seek bottling works, for example.

However, Government lawyers rebut rumors of new antitrust action against Coca-Cola—Minute Maid and Campbell Soup — Pepperidge Farms. Justice Dept. and FTC officials deny anything more than a passing interest in these two heavyweight mergers.

Final outcome of the "passing interest," will be decided by Lee Loevinger, new Assistant Attorney General in charge of anti-trust div. A strong believer in tough antitrust enforcement, he is opposed to consent settlements.

Better Depreciation Rates Coming

Outlook for tax break on new plant and equipment is brightest in years. Administration and growing list of Congressmen concede more realistic write-offs are long overdue. Opposition comes from die-hards that oppose "favors" for industry.

BRIEFS

Crack down on possible tax evasion by businesses through fake foreign subsidiaries is shaping up. Internal Revenue service claims some U. S. firms set up paper subsidiaries in countries with low corporate taxes to beat the tax bite here.

You can expect faster decisions from Washington. White House is passing the word that it won't tolerate endless delays by regulatory agencies.

Proposed trade practice rules for fruits and vegetables apply only to fresh produce, and not to canned or frozen items, FTC says.

(Turn page)

keeps food frozen from warehouse to outlet—without refrigeration

New AVCOLD container can be moved to frozen storage, filled, put in truck, taken to retailer **with one food-handling!** • Keeps 1500 lbs. or 39 cu. ft. frozen for hours. Helps meet standards of Assn. of Food & Drug Officials • Handles with forklift or handjack • 40" x 40" x 60" • Steel, aluminum, foamed-in-place polyurethane insulation • Light.

For more information, write: General Marketing Manager, Nashville Division, Avco Corporation, Nashville 1, Tenn.

Avco / Nashville

Washington Report

Preservatives used in food fats and fatty foods for retarding development of rancidity, must now be specifically labeled, according to FDA. Chemical ingredients from which preservatives are made must be listed. Labeling of fabricated foods in which preservative is used, however, may use preservative's standardized name rather than specific chemical name.

American Institute of Biological Sciences formed a committee to advise Atomic Energy Commission on its program to extend refrigerated shelf-life of selected food products through low-dose radiation processing.

Frozen spinach standards were revised as of March 7. Evaluation of color factor has been clarified as well as definitions of terms under factor of defects. Grade designations remain the same, but minimum total score for each grade is changed.

Instant sweet potato process developed by USDA utilizes subgrade raw product which is difficult to market. Basic processing method has been completed. But, more work is needed on long term storage stability.

Industry representatives met FDA on proposed amendments to Federal standard for cottage cheese. No official action has yet been taken, although it is understood that dairy men are in substantial agreement on the subject.

Grade standards for frozen peaches are under revision consideration by USDA. Revision, if made effective, will be second issue of grade standards for this product.

Research is urgently needed to help dairy firms solve problems involved in marketing milk under changing modern conditions, according to USDA's Research Marketing Advisory Committee.

Complete listing of "Grade Names Used in U.S. Standards for Farm Products" (Agricultural Handbook No. 157) and "Checklist of U.S. Standards for Farm Products" (AMS-210) are available upon request. Write: USDA, Agricultural Marketing Service, Marketing Information Div., Washington 25, D.C.

Comments in opposition to proposed amendment to evaporated milk standard for use of carragheenin (extract of Irish moss) in a quantity not exceeding 0.015%, and for aseptic canning, continues to come in to FDA. Other gums in different concentrations have been proposed. Also involved is the proposal to re-define carragheenin to include the extraction from a number of sea plants rather than one.

FE's Box Score on Key Legislation

BILL	SPONSOR	OBJECTIVE	COMMITTEE
HR 3738	Cooley	Extend Sugar Act, unchanged, to 12/31/62.	Agriculture
HR 3578	Roosevelt	Cut maximum workweek under Fair Labor Standards Act to 35 hr.	Labor
HR 1235	Sullivan	Bar worthless ingredients from dietary foods; give FDA wider inspection authority to seize records, carrier cargoes.	Commerce
HR 3985	Knox	Impose tariff on imported bread (aimed at Canada).	Ways & Means
HR 3869	Celler	Allocate 1% of alcoholic taxes for enforcement purposes.	Ways & Means
HR 892	Anfuso	Establish food stamp plan distributing $1 billion of surplus food to the needy.	Agriculture
HR 3664	Holland	Set minimum wage for farm labor, require federal licensing of crew leaders.	Agriculture
HR 2010	Gathings	Extend Mexican farm labor program to 12/31/65.	Agriculture
HR 2497	Machrowicz	Impose $9 tax on 31-gal. bbl. of beer.	Agriculture
HR 886	Abernethy	Create Agricultural Research & Development Commission for research to expand markets.	Agriculture
HR 4245	Harrison	Impose ad valorem duty of 25% on excess imports of fresh, processed meats.	Ways & Means
S 879	Holland	Extend exemptions under Fair Labor Standards Act to harvesters of fruits, vegetables.	Labor
S 876	McGee	Impose import duties on mutton and lamb (10¢/lb.), sheep and lambs ($3/head).	Finance
S 23	Aiken	Set minimum standards and authorize food coupons for families below the standards.	Agriculture
S 173	Johnston	Create Agricultural Research & Industrial Administration in USDA to develop industrial uses of farm products.	Agriculture

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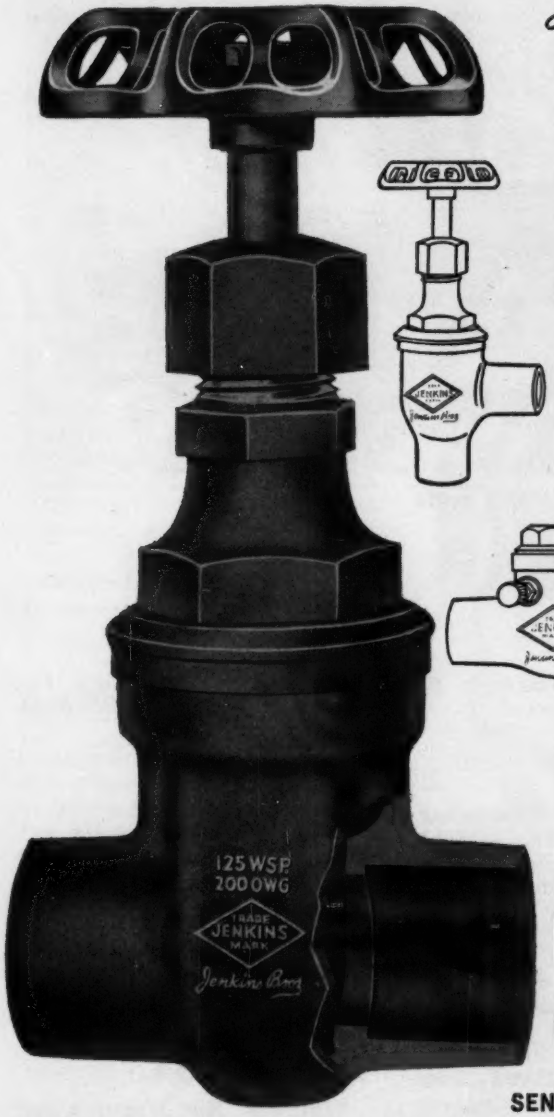
. . . Look for this Mark JENKINS® of Quality Control

Jenkins Bros



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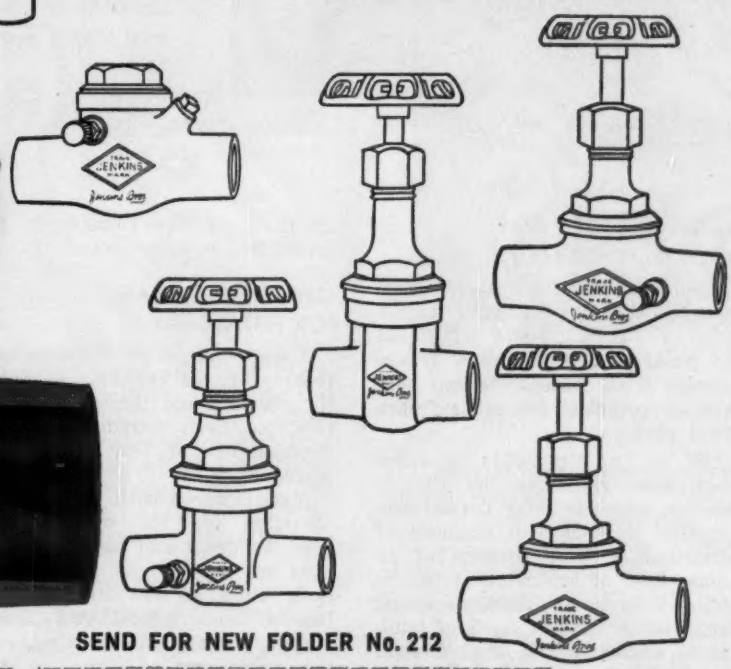
Where "anything will do", you're not likely to see Jenkins Solder (or Socket) End Valves. But you can expect to find them on jobs handled by engineers and contractors who know an economy installation is one you can forget.

Compare Jenkins Solder End Valves with any others. You'll see why they are trusted to give a lifetime of reliable service with a minimum of attention.

Note the thick, smooth bore solder-joint ends that withstand heating and contribute to a quick, leak-proof connection. Look inside at the many Jenkins superiorities in design and construction.

A complete line of top-quality Jenkins Solder End (and Socket End) Valves is available from your local Jenkins Distributor. Ask him to show you a sample of the type you require.



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VALVES
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Jenkins Bros., 100 Park Avenue, New York 17
Send folder No. 212 describing all Solder End and Socket End Valves.

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new packages & products

SPIRAL-WOUND FOIL CANS

POLY POTATO BAG

NEW WAFER MINTS

FOIL FRY PAN

FOIL CANS SEEK FROZEN FOOD MARKET

Spiral wound aluminum foil cans, a development of Anaconda Aluminum Co. (410), are now being used to package Southern Sun frozen orange juice concentrate and hold similar potential for other frozen food packers.

R. C. Can Co. (401) produced new 6-oz. cans for the Florida packer, which is using normal production methods and channels of distribution. Can consists of an inner liner of laminated aluminum foil, a body wall of fiber board, and an outer protection layer of laminated aluminum foil which doubles as the label.

An initial savings of about 20% is reported over the conventional 6-oz. tin plated steel can and about 14% over an aluminum can with tin plate ends. In addition, an average of 10% savings in rail freight shipments from Florida to all parts of the country is reported by the juice packer.

OPAQUE POLY BAG FOR POTATOES

A white-opaque polyethylene bag, reported to be the first available for growers and packers of potatoes, has been introduced by the Produce Div. of The Kordite Co., Macedon, N. Y.

Manufactured with tubular construction and full white opaque color on front and back, bag permits up to 5 colors printing on both sides. Plastic quality enhances sales appeal and transparent window adds to visual appeal. Problems of wrinkling and soiling have been virtually eliminated. (402)

ALUMINUM FOIL DEBUTS DISPOSABLE FRY PAN

Potential packaging premium for specialty products manufacturers is this disposable aluminum foil fry pan introduced by Ekco-Alcoa Containers, Inc.

Products may be overwrapped with cellophane or aluminum foil, or frozen foods may be cooked on top of the oven right in the pan. Unique shape is aimed at impulse sales for consumers who can carry, cook, and serve food from the same package.

Holding about 2-lb. of product, pan provides approximately 6-in. of cooking surface. (403)

MARKET WAFER MINTS WITH GINGER APPEAL

"Thin Jer" Mint Wafers, a new combination of thinnest crisp ginger cookies and a coating of mildly mint-flavored pure chocolate, have been introduced by Burry Biscuit Corp.

Attractive package design shows an elegant crystal dish filled with a sprig of fresh mint in a

CONVENIENT 'HANDLE' BOTTLE

REDESIGNED GOURMET PACKAGE

FOR DIETARY MARKET

CLEAR SNACK PACKAGE

background setting of adroitly draped, pastel-green satin. Sleeve and covered tray construction helps protect product and emphasize quality.

Lippincott & Margulies (404) is package designer and Lord Baltimore Press Fidel-I-Tone (415) produces the appealing overwrap.

CONVENIENCE BOTTLES FOR NEW SALAD OIL

Unsaturated salad oil, marketed under the name of Western Chef, is being distributed by the Ranchers Cotton Oil Co., Fresno, Calif., throughout the Western states.

Retailing in three sizes—pint, quart, and half gallon bottles — product is a poly-unsaturated California vegetable oil refined as extracted without exposure to air or light.

Half gallon bottle features a convenient, easy-to-use built-in glass handle while quarts and pints have no-drip pouring rings. Bottles and closures are supplied by Owens-Illinois Glass Co. (405); labels by Schmidt Lithograph Co. (406)

DESIGN GOURMET PACKAGE FOR POPULAR APPEAL

Providing a popular appeal for a gourmet product is the theme behind the new package design of frozen Hors d'Oeuvre "Hot Puffs" from Gretchen Grant's Kitchens, Inc., Jersey City, N. J.

New design, from Lane-Bender, Inc. (407), emphasizes distinctive quality appeal and strongly identifies the brand and name of the product. Previous design was cluttered and had a "catered affair" look. Present texture and background takes package out of exclusive specialty shops and into the supermarket by suggesting a "contemporary mode of living."

MARKET DIET FOOD IN FOIL PACKETS

General Mills may have a double winner in "Subtract," a dietary food in a convenience package.

Subtract is a measured calorie food product, which, when mixed with water, can be substituted for one, two, or three meals a day in a dietary program. Product comes in convenient foil packets, each with 225 calories, the correct amount for one service.

SEMI-RIGID FILM ASSURES SNACKS PACKAGE CLARITY

A combination of cellophane/polyethylene/cellophane is providing additional eye appeal and superior product protection for the "Tops" line of nuts and meats from The Pittsburgh Snax Co.

Three-color, gravure-printed Durafilm from The Dobeckmun Co. (409), eliminates long-standing problem of salt clinging to the in-

stops sticking

speeds packaging

cuts cleanup

saves money

SLIPICONE

silicone release agent

"wherever sticking is a problem"

SLIPICONE® goes on in a breeze . . . makes any surface slick . . . keeps adhesives, packaging materials and foods from sticking or piling up where you don't want them . . . keeps equipment cleaner, more sanitary . . . assures neat, attractive packages and labels.

SLIPICONE is nontoxic . . . safe to use in contact with all foods. Stays effective over a broad temperature range . . . from 40 below to 400 above zero!

SPRAY OR WIPE IT ON

SLIPICONE comes in four handy sizes: 12 oz. aerosol can; 2 and 8 oz. tubes; 10 lb. can . . . all economical to use.

Get SLIPICONE from your paper merchant, packaging materials supplier, or write Dept. 3715 for name of nearest distributor.

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Dow Corning CORPORATION
MIDLAND, MICHIGAN

side of the package, thus clouding transparency and sparkle. Laminated material also offers good rigidity and protection.

DISPOSABLE CARTON of one-piece construction is being introduced for one-way bottles and cans by Packaging Div. of Olin Mathieson Chemical Corp. A "Syncropacker," requiring only one operator, is used for packaging. (411)

New Product Shorts

Borden Foods Co. adds a new convenient potato product, Quick Cook Potato Slices, to national market. Borden also announced coffee-flavored addition to its Ready Diet line and promised several more flavors soon.

Pet Milk Co.'s Institutional Div. announces Instant Malt Flavored Syrup for fountain trade. It's said to give "a true malt flavor at lower cost than malted milk powder." Same firm is testing two new weight control products, Sego Liquid Diet Food and Pet Diet Food 900.

Quaker Oats Co. will market "Life," a pre-sweetened oat cereal "containing the most useful protein of any ready-to-eat cereal on the market."

Hiland Potato Chip Co., Des Moines, Ia., has added a bacon-flavored chip to its line of snack foods.

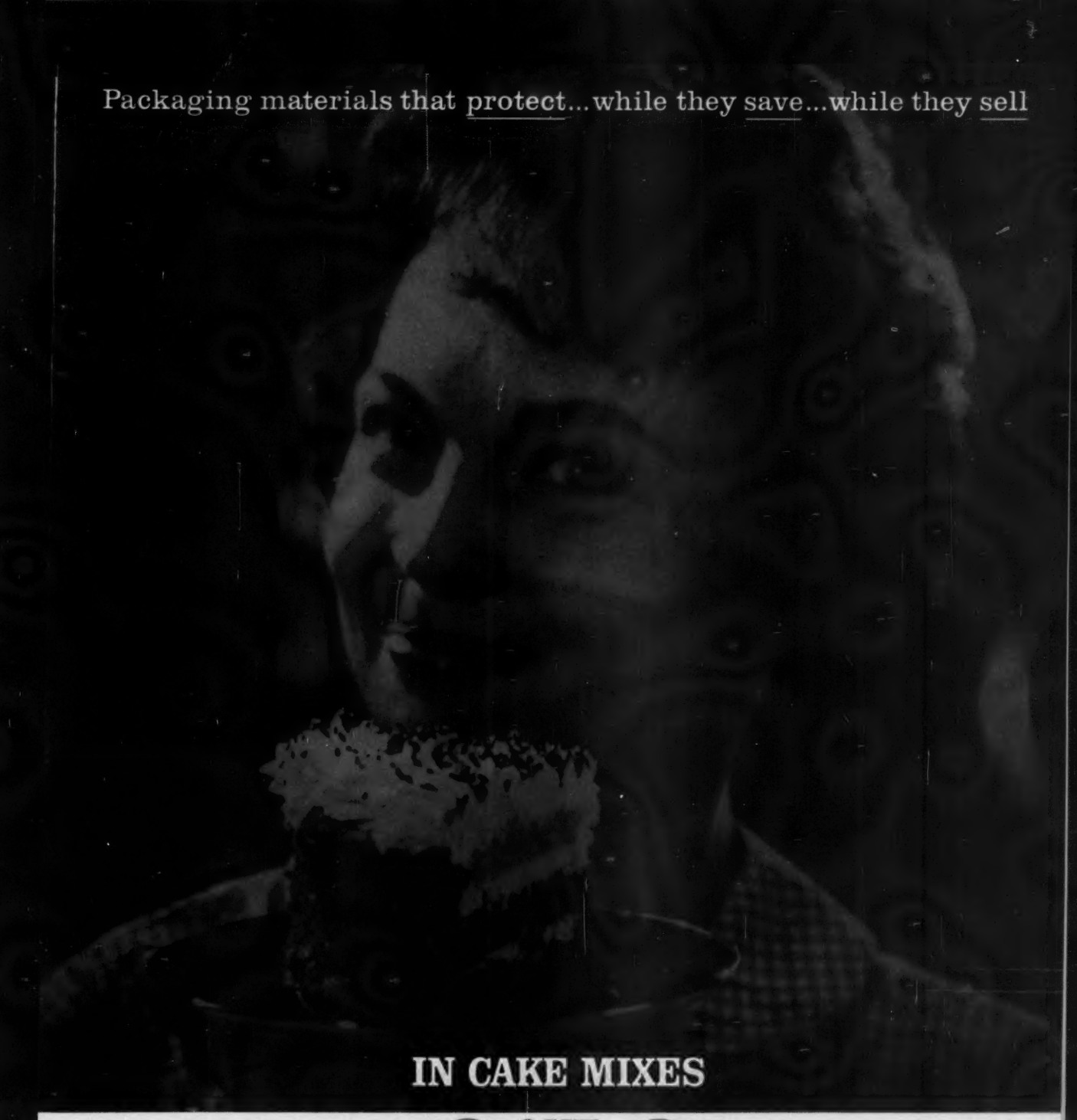
Packaging Briefs

Rugged cellophane claimed to extend product shelf life and cut down on re-wraps is on the market from Olin Mathieson Chemical Corp., Polyethylene-coated film, Olin 300 OF-18, is suitable for wrapping all fresh red meats. (412)

Three-color, one-pound butter wrapper from Paterson Parchment Paper Co. has "June is Dairy Month" theme of nation's dairies. (413)

Clinging plastic film for in-store packaging of produce, poultry, meat and cheese is said to "combine crystal clarity with superior heat sealing and heat shrinking qualities. Supplier is Reynolds Metals Co. (414)

Packaging materials that protect...while they save...while they sell



IN CAKE MIXES

Six of the eight leading manufacturers of cake mixes are *regular* users of Riegel protective packaging materials. Their long experience with Riegel has given them faith in Riegel's technical leadership and performance in delivering the *right* papers for widely varied products. This confidence is demonstrated by sales leaders in *many* fields . . . good reason why you too should know Riegel.

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To assure just the right combination of product protection, machine efficiency and low cost packaging for *your* products, Riegel offers more than 600 different materials ... standard or tailor-made. Pouch papers, paperboards, glassines, foils, films ... laminated in various combinations . . . plastic-coated or waxed . . . printed or plain. Write to Riegel Paper Corporation, 260 Madison Ave., New York 16.

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These new pre-gelatinized starches eliminate cooking, prolonged stirring, cooling. Housewife or chef, you simply add liquid to ready mixed specialties and stir. Another outstanding convenience in modern day specialty foods.

Instant Starches from National give every effect from glossy, crystal clear toppings to creamy homogeneous sauces. They even act as a freshener for cakes baked from mixes. We'd be glad to make recommendations. Just contact your nearest National office.

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And All Principal Cities in the United States, Canada, England and Mexico

Don't Help Russia to Improve Food Factories

Russian food factories are far behind American, with few exceptions. Soviet canning and freezing plants waste labor so lavishly as to put U. S. counterparts out of business, but fast.

Inasmuch as the Reds are not hungry, we should not help them to improve. Why? They are out to bring underdeveloped countries into their orbit, with the ultimate aim of plowing under those who are free. And what better weapon could they use than food—plus the know-how to produce and preserve it? Food is our great persuader on behalf of freedom, as pointed out on this page last month.

Russia sends teams to steal our progress

If we are to keep that advantage, we must be on guard. Russia is sending industrial teams to the U. S., some to visit food plants. Even her tourist teams often are made up of industrial executives and engineers, and Amtorg tries to get these "tourists" into factories.

Such visitors should not be allowed to obtain detailed information about our advanced food processing machinery. Nor should equipment makers sell Russia any food machinery, other than that with limited use.

You'll better appreciate the need for caution if you know how the Soviet "develops" food machinery.

Russia has a magnificent system of industrial intelligence. It starts in the food field with a technical institute for each branch. Take the baking industry, for example.

It has an outstanding library with seven or eight high caliber employees. Half of these are busy translating 60 to 70 technical journals and other publications from the West. This institute also has catalogs from foreign food machinery manufacturers.

Translators feed information to the institute staff of more than 600. Of these, 250 are scientists engaged in applied research. Another 350 are involved in food pilot plant operations. And there are 70 in a large, modern machine shop that can fabricate full-scale food machines.

Information is converted into machines

When engineers in this institute get information about a new machine from any source, they transmit that information into sketches. Draftsmen then convert these sketches into design drawings. The machine shop now builds the equipment for test. Then the pilot plant puts it into operation to find "bugs." Improvements are made until unit is satisfactory. And as many machines are built as needed for Russian plants.

If Russia can buy one piece of American equipment, the institute will test it for 6 months in the pilot plant. If OK, the machine is then turned over to the machine shop to be copied.

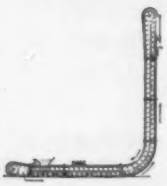
With a little good help—like information gained in visiting our food plants, or one machine purchased over here—Soviet food institutes can go a long way.

Let's not give them that help. Our food weapon is too valuable in the cold war.

STEPHENS-ADAMSON

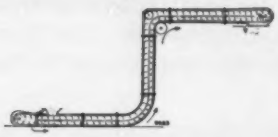
moves bulk material en masse vertically — horizontally — on inclines or around bends with REDLER® CONVEYOR-ELEVATOR SYSTEMS

S-A REDLER Conveyor-Elevators have a coveted 25 year reputation of successful operation. Well over 20,000 units handle a wide range of pulverized, granular, small lump and flaked materials in plants throughout the world. The REDLER Conveyor-Elevator moves material by EN MASSE action horizontally, vertically, on inclines or around bend corners. Material movement is continuous within totally enclosed, dust-tight compact casings, permitting large tonnage handling in small space. REDLER Conveyor-Elevators can be adapted to removing solids from a liquid bath in solvent extraction plants. The conveying elements, a series of U-type skeleton flights shown above in cut-away, move readily around sprockets and bend corners with relatively low power required at the drive. Skeleton flights may be easily unhooked and replaced without tools. S-A REDLER Conveyor-Elevator Systems speed efficiency reducing bulk materials handling to lowest cost per ton.



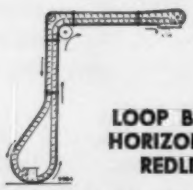
L-TYPE REDLER

Lower run can be horizontal or inclined. Elevating run can be operated at any required inclination. Special discharge openings can be spaced anywhere. Discharge to any one of three sides. Many variations of standard L-Type system available.



Z-TYPE REDLER

Combines two horizontal conveyors and one vertical elevator into one compact unit. One feedpoint, one discharge and one drive. Feed from choked feedpoints on horizontal run.



LOOP BOOT HORIZONTAL REDLER

Simplest form for elevating material up steep inclines. Column of material is supported on all four sides at inclines above the angle of slide for materials handled. Low headroom for feedpoints. Discharge gates placed wherever needed.

HORIZONTAL CLOSED CIRCUIT REDLER

"Run-around" type system employs side-pull conveying element. Permits conveying in several directions on horizontal plane. Available in two-way version featuring 180° bends and four-way version featuring 90° bends.

WRITE FOR BULLETIN 358

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FOOD
ENGINEERING

FREEZE-DRYING

Where It Stands in Europe

Food expert finds European interests in freeze-drying parallel those at home. R & D and processing gain momentum . . . but cost is critical factor there, too

FREEZE-DRYING IN EUROPE is not unknown as one might possibly think. Rather, it is a lively topic in food manufacturing centers there.

At a recent International Congress of Industrial Chemistry held in Barcelona, Spain, this author was highly gratified at the interest manifested in the paper he presented there on "Commercial Applications of Lyophilization to Foods." Although delivered in English, the address was well received by a large audience of Europeans and a number of requests were presented afterwards for copies of the paper.

During a visit to the University of Barcelona, an opportunity was afforded to inspect apparatus being used there for the study of lyophilization of biological and pharmaceutical materials and to discuss projected expansion of this work into the dehydration of foods. The amount of basic scientific study there on lyophilization phenomena was impressive—which characterizes the European approach to the subject. This contrasts with the American effort in this field which rather emphasizes applied research to further commercial development of freeze-dried foods.

From Barcelona our interest in this field led us to Holland, West Germany and England, where a recent stimulation by industry in the lyophilization process seems to parallel the rising tide of conferences, publicity and investigation running so strongly in this country on the subject of vacuum freeze-drying.

Vegetables Freeze-Dried

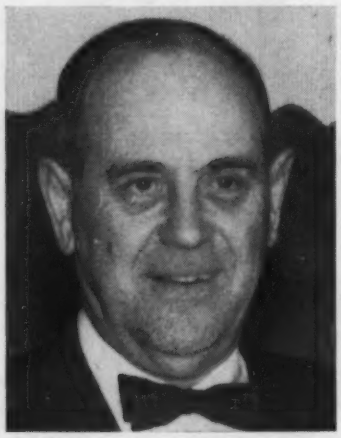
At Oss, Holland, a visit was made to Hartog's Fabrieken, where a two-chamber Leybold installation has been in operation for several years for the freeze-drying of pre-cooked, deboned chicken in dice form, as well as blanched mushroom slices. These have been utilized in dry-soup mixes. A

JOHN H. NAIR Consultant to the Food Industry, Summit, N. J.

Meet Dr. Nair . . .

Dr. John H. Nair of Summit, N. J., is a physical chemist and food technologist widely known in this country and abroad. He was educated at Beloit College and Syracuse University, and began his research career after World War I with the Merrell-Soule Co. in Syracuse. Research incuded: Physics and chemistry of milk fat; rheology of cream; packaging of dried milks in inert gas and under vacuum; development of a diabetic milk powder and of dried acidophilus milk; stability of milk protein; effects of non-fat milk solids on bread baking, and other related problems.

When the Borden Co. acquired Merrel-Soule in 1928, Dr. Nair continued as assistant director of laboratories there. Work involved improving dairy product quality of fluid, dried, and frozen forms through modifications in processing techniques. Other work included flavor evaluation, consumer acceptance tests, and selection and adaptation of packaging materials to



provide moisture protection. In 1938 he became technical advisor to the Dry Milk Sales Division of Borden.

At the outbreak of World War II, Dr. Nair joined Thomas J. Lipton as assistant director of research. The company then was producing dried soup mixes for the armed forces. Under his supervision, studies were made on tray and tunnel drying, atmospheric and vacuum drying, as well as freeze-drying of various foods. Lyophilization studies led to the adoption by Lipton in recent years of large scale freeze dryers for dehydration of diced chicken meat and mushroom slices and of vacuum belt drying for tea extracts (see FE, Nov. 1960, p. 98). For 15 years he served as liaison on food matters in the U. S. for Unilever Ltd. of London.

Upon retirement from Lipton in 1957, Dr. Nair has become part-time consultant to a number of companies in the food industry. He's a director of Onyx Chemical Corp. and of Avi Publishing Co. Active in many technical and scientific societies, he has been president of the American Institute of Chemists and of the Assoc. of Research Directors, as well as founder-member of the IFT. He's listed in Who's Who and in American Men of Science, and in 1958 received the honorary degree of Doctor of Science from his alma mater.

large number of vegetables have been freeze-dried experimentally. Samples of these were examined:

► **Onion slices** were paper white in color and much stronger in flavor than similar material dehydrated in tunnels.

► **Flowers of cauliflower** presented a most attractive appearance and rehydrated rapidly.

► **Parsley flakes** retained a brilliant green color but were extremely brittle.

► **Celery** remained white and was fairly tender when rehydrated, more so than tunnel-dried material seen elsewhere, though this may have traced back to differences in the raw material used.

► **Carrot dices, swedes, asparagus and spinach** were other dried vegetables seen. Freeze-dried carrots appear to lose color rapidly and require storage under inert gas.

Plans are being made here to acquire an additional freeze-drying plant—with both Leybold and Vickers-Armstrong systems under consideration. This installation will likely be made in northern Holland near the center of the vegetable-growing area, for it is projected that freeze-dried material will be substituted for the less appetizing tunnel-dried vegetables of poorer appearance which currently are being incorporated in the Hartog soup mixes.

We were unable to inspect Knorr's soup mix plant in Switzerland. However, we learned that freeze-dried vegetables were already being incorporated to a limited extent in their soup mixes—with some of the dehydrated asparagus being procured in the United States. No confirmation could be obtained of a report that Knorr planned to install a Leybold system in an operation in West Germany.

Developments by other companies include: Nestle's (Maggi) plans for freeze-drier installations in southern France and in West Germany—quite possibly Leybold equipment; and Unilever's planned construction of a plant for vegetable dehydration in southern France, where several types of dryers will be installed, including a vacuum freeze-dryer.

Leybold Headquarters Visited

A side trip was made to Koln-Bayenthal, headquarters of Leybold Hoch-vakuum Anlagen. Leybold has been an important name in vacuum pump equipment for many years. The subsidiary firm, which has developed the freeze-drying plant, is a joint venture of several companies. Starting a few years ago with a design consisting of a single cabinet, dry vacuum pump and freeze-condensers, Leybold has recently developed a system of automatic control of the vacuum, which maintains the chamber at a temperature just below the melting point of the ice phase in the material being dried. This ensures removal of free water by sublimation so long as ice exists. Subsequently the temperature of the drying material is rapidly raised to the neighborhood of 70C. to complete the reduction of residual moisture to 2%, on the theory that heat injury to the already dried shell of the specimen will, under such conditions, be relatively slight. Operating on this premise, Leybold employs much shorter drying cycles than those which have characterized the more classical conditions employed with other freeze-drying equipment. Leybold engineers contend that this speed-up has been realized without a degree of impairment in quality of the rehydrated food material which may be distinguishable by

the taste-discerning consumer.

Leybold has developed the design and is now manufacturing on order, multiple unit plants in which carriers loaded with trays of pre-frozen food particles are conveyed on an overhead rail through a series of cylindrical vacuum chambers, about 25 ft. long. Each pair of chambers is supplied with its separate vacuum pumps, condensers, and refrigerating system. The loaded carriers are admitted at intervals through an airlock chamber into the drying chambers, and move forward intermittently through the same on a predetermined time cycle. When a carrier arrives at the exit airlock chamber, the food material has been dried to the desired low moisture content. The trays can be hydraulically lowered onto and retracted from the surface of hollow heating plates, which are integral with each vacuum chamber. A vacuum steam system supplies the necessary heat to these plates. Processing conditions of plate temperature, chamber pressure and time cycling are automatically controlled. The theories on which the adjustment of "barometric temperature control" is based have been fully developed by Neumann.[1]

Costs quoted by Leybold in their brochure describing such equipment approximate $400,000 for a 160-sq. m. (1700 sq. ft.) system equipped with dry vacuum pump. condensers and refrigerators. On this basis the capital investment per unit of loading space is approximately $230/sq. ft. Presumably, this is the installed cost. With an estimated daily throughput of cauliflower pieces of 5.6 tons, Leybold calculates a drying cost as low as 2.6 cents per wet pound. One such system for "continuous" drying has already been ordered for installation in Europe.

Experimental Factory at Aberdeen

Any survey of freeze-drying in Europe inevitably includes a visit to the Experimental Factory in Aberdeen, Scotland, established by the British Ministry of Agriculture, Fisheries and Food. Research on dehydration methods for foods has been maintained here since the end of World War II. Dr. J. M. Hay directed these operations for many years, with Mr. S. M. Hanson more recently at the helm. Since the resignation of Mr. Hanson to join Armour's, Ltd., Dr. E. G. B. Gooding has been acting as head. The Ministry plans to bring investigations to an end at Aberdeen in March, 1961. Ministry belief is that the government has carried developments in food dehydration to the point where industry can now put these to commercial use and pursue such further processing studies as may prove necessary. With this terminal date close at hand, the accelerated freeze-drying (AFD) plant used in the Aberdeen experiments has been sold to Lyons, Ltd. This dryer is a modification of equipment built by A/S Atlas Maskin fabrik, Copenhagen, involving movable plates, hydraulically activated. Loading capacity is approximately 1¼ tons. Detailed description of this equipment has been published recently.[2] In order that drying systems duplicating Atlas may be available from national sources for procurement by interested British food processors, the Ministry has persuaded Vickers-Armstrong to undertake the manufacture of such equipment in their South Marston Works.

Pressure Variable Tested

Recent experiments at Aberdeen have raised questions as to the advantage of using pressure on the heated platens to maintain contact between them and the product being dried, even if one inserts metal mesh to facilitate the escape of water vapor. This continuous contact between platens and product accelerated materially the transfer of heat to the ice inside the particles and thus greatly shortened the drying cycle.

In some comparison tests initiated last October in Aberdeen, fish steaks 15 mm. thick were dried by the usual AFD method, applying pressure to the platens. Drying time was approximately 7½ to 8

[1] *"Mess-und Regelprobleme bei der Gefrier Trocknung," K. H. Neumann. Advances in Vacuum Science and Technology, Vol. II, 712-717. Pergamon Press, London (1959).*

[2] *Food Engineering, 61-62, Dec., 1960.*

Cambridge University Studies Product Changes

The Low Temperature Research Station at Cambridge University has been engaged in studies of vacuum freeze-drying of foods for the past quarter century. Some of the earliest investigations in this field were carried on there by E. C. Bate-Smith and R. Gane. The writer visited these two scientists at Cambridge to discuss the present status and possible future of freeze-dried foods. One point of general agreement was that the texture of freeze-dried foods, particularly the high protein foods such as meat and fish, is materially altered during the drying process. It is essential for the prevention of non-enzymatic browning to dry to very low moisture contents, circa 2%. Under such extreme conditions the structure of protein framework in the tissues is undoubtedly changed. Denaturation occurs, cross-linkages tend to form between proteins, while some loss of solubles may occur due to blanching in the preparational processes.

Rehydration up to 80% may be possible under certain conditions but the tissues will not become turgid, since osmotic pressure does not come into play because of changes in the cell walls. Water may be imbibed as in a sponge but is easily squeezed out again during mastication. The pieces of food feel dry, flavor-containing liquid quickly is lost out of the cell structure, and the texture becomes reminiscent of dry bits of wood or sawdust. The effect is more pronounced in some food products than in others. Woody-fibred vegetables and meats and poultry suffer most in this textural change.

In foods containing a significant percentage of fat, oxidation can cause rapid quality deterioration if dried down to 2%. Water of hydration has been lost and this anti-oxidant factor must be compensated for by storing the freeze-dried product under inert gas or treating with anti-oxidant.

Further, the staff of the Low Temperature Station believes that producing a freeze-dried product which is completely revertible on rehydration may be most difficult. They doubt that the consumer would ever settle for a poorer quality of even the best freeze-dried foods. And this lies outside the question of the relative cost of foods in fresh, canned, frozen or freeze-dehydrated states.

hr. When similar fish steaks were dried under identical conditions except that a distance of about 10 mm. was maintained between the top material surface and the heating plates, the drying time was about the same (8 to 8½ hr). Fish steaks can stand a fairly high applied pressure (ca. 8 psig) which may well not be true with such materials as leafy vegetables.

One may conclude from these latest results that heat transfer by radiation works about as well as conducted heat with continuous pressure contact. Seltzer[3] reported similar results at the recent conference held under the auspices of the R & D Associates of QM Food and Container Institute to discuss freeze-drying. Apparently the contact of the plate under pressure does not speed up heat transfer through the already-dried shell of the individual particle. These recent findings may well lead to the elimination of the movable feature of the heated platens with its attendant hydraulic system and linkages. This could materially lower the construction cost of the continuous plant proposed by Vickers-Armstrong.

Process methods researched . . .

In view of these new findings and the fact that Vickers-Armstrong was reported to have sold one single-chamber unit to Batchelors Peas, Ltd., and two to Armour (U.S.A.), a visit was arranged to their pilot plant and development laboratory located near Swindon. Here an inspection was made of a variety of freeze-dried food samples, including shrimp, fish fillets, meat pieces, meat dices, strawberries, carrots, onions, celery, and other vegetables and fruits. Some of these had been dried in their own experimental equipment and some at Aberdeen. Conclusions were that generally the quality was uniformly inferior to that of the Oss samples, which had been dried by radiation heating in conventional chamber equipment for an 18-22 hr. cycle under less than 500 micron absolute pressure.

Current experiments at the Vickers-Armstrong laboratory were being conducted with radiation heat transfer in a rather conventional cabinet under high vacuum developed with a dry pump and with sublimed vapor being condensed out with "dry ice" refrigeration. Results indicate that accelerated freeze-drying with pressure plates causes a material injury to the dehydrated food such as may leave it without superiority to material dried by methods far less expensive than freeze-drying. If the Atlas dryer is operated under conditions which yield a freeze-dried product conspicuously better on rehydration than when dried by other conventional methods, it seems highly probable that the drying will be about as long as in other cabinet types of lyophilization equipment.

The single cabinet AFD system offered by Vickers-Armstrong consists of either a cylindrical or rectangular chamber fitted with 16 platens and 15 shelves, each holding four trays measuring 3½ x 2 ft. Either mechanical pumps with condensers or steam injectors are offered. A hydraulic pressure equivalent to 6.5 psig can be superimposed by moving the platens together as desired. Capacity is rated at 1¼ tons of raw product/24 hr. Cost figures quoted for this dryer with 420 sq. ft. of tray area, when steam injectors are supplied, approximate $90,000 f.o.b. factory, or about $214/sq. ft.

More Studies Under Way

At H. J. Heinz Ltd. there is also a very marked interest in the potential application of freeze-drying to foods. A Danish engineer has recently been engaged to devote full-time to the subject, leading to actual experimentation. A pilot plant program will be included. Indications are that Leybold batch equipment has been chosen for this installation, to be made in the Harlingen plant.

The Food Research Laboratory of Unilever, Ltd., at Colworth House has a well-equipped pilot plant in which studies are continuously underway on a wide variety of food processing techniques. Installations here include several types of dehydrators (spray, drum), tunnel, cabinet and freeze-drying systems. Resulting experimental work has produced some novel dehydrating processes. Among these is the through - drying of fresh green peas, the skins of which are first punctured with needle-like pins on an ingenious continuous drum developed in Colworth House. Such pricked peas are rapidly dried to 10-15% moisture by through-air flow and finished off with bin drying. Rehydration is accomplished easily and rapidly, so that preparation time in the home is not any longer than with frozen peas. The eating quality of such rehydrated peas compares very favorably with that of the frozen variety. Batchelors Peas, Ltd., a Unilever subsidiary, have been processing dehydrated peas in this manner for several years and the projected pack for 1961 runs to important tonnages.

Costs Govern Commercial Potential

As a consequence of the extensive work done at Colworth House on dehydration of meats, vegetables, fish and fruits, the management group believes that the commercial application of freeze-drying will be limited to products which can bear the inevitably greater cost for water removal by such methods or which yield a dry substance of a quality not possible by other drying techniques. These limitations would be quite restrictive and argue for a slow adoption of lyophilization for food preservation. A great deal depends on how much premium the consumer will pay for freeze-dried foods and how rapidly he can be educated in the utilization of dehydrated foods of superior quality and great convenience.

Nonetheless, in Europe many food manufacturers are making important investments in research and equipment towards the goal of acceptable freeze - dehydrated food products. Interest is intense, a degree of mild optimism seems to prevail, and increasing tonnages of lyophilized food are being processed. How large may be the volume which the consuming public will ultimately accept remains for the future to disclose. If an important break-through in drying costs occurs, the quality of some freeze-dried foods will be sufficiently acceptable to the public so that the market can expand rapidly. (End)

[3] *"Some Efforts to Accelerate Freeze Dehydration," E. Seltzer. Proceedings R & D Assoc. QM Food & Container Inst., Sept. 1960. (In press)*

Tougher Ground Rules Ahead

Here's What FTC Wants To Know About Your Operation

FTC's questionnaire to food manufacturers is a wide-ranging one. Here is a rough guide of what to expect:

- Acquisitions and disposals made from 1950 thru 1959.
- Payments to Customers: Total amount for sales promotion in '58 and '59. Plus the following details on the 5 largest such expenditures: Title of plan, products involved, duration, geographic areas covered.
- Procurement: Sources of supply, expenses paid to them, contract limitations.
- Sales by Brand and Customers: Sales to the following classes of customers—10 biggest food chains, all other chains of 11 or more stores, independents and chains of 10 or less units, other retailers, wholesalers, mass feeding institutions, other manufacturers, outlets who buy for further processing, exporters. For each category, report sales in own brands, customer's labels, or other brands.
- Operating Costs: Sales allowances for labels, freight out, and "other." Expenses for storage, brokerage, advertising, field sales, administrative and general, "other."

Probes, new enforcement twists, local "watchdog" offices give government bigger say in making and selling foods. . . . Here's a recap of potential booby traps to watch out for

OMINOUS TRENDS spell more government interference in your day-to-day operations this year. Chances are greater than ever that (1) an FDA inspector will knock on your door, and (2) that FTC will ask for intimate information on your customer relations (especially the financial angles).

Beefed up budgets for the two agencies, plans for tougher enforcement, shift in personnel, and Congressional undercurrents—all these stress the fact that Government will have a bigger say in your business decisions this year. How big depends upon the industry's efforts to clean house, how effective food men make their voice heard in legislative halls.

Complicating the picture is a grass-roots campaign at the local level to ready potential booby traps for food makers. One such drive, centered on state capitols, aims at creating special "watchdog offices" to "represent" consumer interests.

At least 6 state legislatures—Conn., Mass., Minn., Nevada, N. Y., and R. I.—will consider bill creating such an office. And Pres. Kennedy's election enhances the prospects of a similar Federal-level post. He promised, during the campaign, to act as the consumer's "lobbyist," and the Democratic Party platform called for a new office "to speak for consumers in the formulation of Government policies."

Soap Box for Yahoos

Even if Congress balks at the idea, the President can bypass it by setting up a separate office or agency in the executive branch. What disturbs industry sources is the possibility that an irresponsible official occupying the office could use the government's vast information channels to give official sanction to more snooping into business affairs, fan the fires of anti-marketing sentiment, and launch highly publicized attacks on such controversial points as deceptive packaging or even the fats in food issue.

(Turn page)

THAYER C. TAYLOR Associate Editor, "FOOD Engineering"

In any event, the two agencies that food men come in contact with most frequently will have stronger artillery at their disposal this year. FDA, for example, has a good chance of having its budget fattened from $19.5 to the $23.4 million it's asking for. Bigger outlay will go for more factory inspectors as well as stepped-up enforcement in deceptive packaging and mislabeling areas.

Several food firms in recent months have felt the sting of FDA's greater interest in merchandising practices. With its prestige in Congress and among consumer groups at record peaks, FDA figures now is a good time to push into areas once considered FTC's preserves.

FTC, too, will find Congress sympathetic to a bigger budget. But even more important to food men are these four signposts that signal a stronger FTC influence in the food business—overhaul started by former chairman Earl W. Kintner, pioneer-type R-P complaints begun last year, ambitious long-range economic inquiry into food marketing, and the naming of Paul Randall Dixon as chairman.

Muscle-Building Started

Former FTC Chairman Kintner spent months rehoning his group into a sharper, faster-moving enforcement tool. When he told GMA's '59 meeting of his plans for a R-P "task force," few present there sensed the dramatic consequences this move would have (FE, Dec. '59, p. 45). For the task force has sparked some bold innovations in food industry enforcement.

One of the first was issuance of informal guides covering the advertising allowances, merchandising payments, and services that come under sections 2 (d) and (e) of the R-P Act. Previous guides had been confined to deceptive practices, but the new set pushed into the sensitive anti-trust area.

A second task force suggestion, which gave the commission a bigger net for snagging culprits, was use of Section 6 of the FTC Act on an industry-wide basis to uncover possible violations of R-P. This clause empowers FTC to use mail questionnaires, instead of time-consuming on-the-spot investigations, to find out whether abuses are going on. And it can be productive. Kintner told FE's Washington editor that, based on questionnaires sent to processors and distributors last Fall, FTC "would have 2,000 cases if we picked up all the potential violators of the law."

This device, understandably, has drawn a heavy barrage of industry criticism. Clarence Adamy, executive vice pres. of the National Assn. of Food Chains, dubs the procedure "mail order enforcement," contends it is based on "conjecture rather than complaint."

Joining Adamy, in probably the oddest mixed marriage of the year, is Rep. James Roosevelt, chairman of the House Small Business Subcommittee which investigated the food industry last year. At the recent canners' convention, he said the mail inquiry forces companies to incriminate themselves unknowingly, urged trade groups to do something about it.

Chances are strong, though, that FTC will use the mails at a faster tempo this year. Before his exit, **Kintner observed: "Range and speed of (fresh fruit) investigation amply demonstrates the effectiveness of legal investigation by special report, and amply justifies its continued and expanded use."**

R-P Ground-Breaking

Along with reviving little-used techniques, FTC last year broke new ground in its R-P enforcement drive against the food industry. In notable actions which have serious implications for the future, the FTC . . .

. . . Held for the first time (in the Grand Union case) that a buyer's knowing inducement of discriminatory ad allowances is an unfair trade practice proscribed by little-used Sec. 5 of the FTC Act. Adamy warns that this use of Sec. 5 is "an assumption of legislative authority by an administrative agency."

. . . Launched concurrent actions against manufacturers and distributors involved in "anniversary sales." Benner Tea and J. Weingarten chains were charged with violating Sec. 5 by inducing discriminatory ad allowances, and food and beverage makers were accused of violating Sec. 2 (d) of R-P in granting such payments.

. . . Ruled for the first time on the defense that a seller's discount to the buyer was a functional one. In the Venus Foods case, FTC held that the facts in each instance must determine whether such a discount is a bona fide one or is an illegal payment in lieu of brokerage.

. . . Staked out broader jurisdiction over products moving intrastate. In actions against National Dairy, Southern Bakeries, and American Bakeries, FTC contended that while products involved in the complaints did not cross state lines, the companies' operations must be viewed as integrated, i.e., interstate, in character.

. . . Tackled the tricky problem of private label pricing. Borden Foods was accused of price discrimination in charging a higher price for its own advertised evaporated milk as compared to the item it packed for private label.

A third factor that points to FTC's deeper involvement in the

Clean House Drive

How well is the industry making out in promoting better ethics in the market place? To find out, FOOD Engineering surveyed food and beverage company presidents on the trade practice recommendations issued in '59 by Grocery Mfrs. of America and six distributor associations.

Fifty-eight per cent of the responding firms said they had received the printed suggestions. Among those firms, 71% took steps to circularize the recommendations or make some other active use of them.

food industry for years to come is its massive economic inquiry. Concentration and integration in retailing, freezers and canners have already been covered.

Future plans call for extending the mail probe to practically every major industry segment — baked goods, cereals, dairy, fresh fruit and vegetables, meat, poultry. Questions put to each segment will depend upon what's learned from earlier surveys, plus what the commission's interest areas and policies are at the time.

The larger the firm, the more likely it knew of the proposals. Thus, among outfits grossing $10 million or less, only 50% acknowledged awareness of the trade practices brochure—compared to 56% in the $11-99 million bracket, 75% in the $100 million or over category.

FE's survey results also indicated strong industry enthusiasm for the recommendations. For example, among the small firms who received the set, 79% made active use of it. Among the large-size outfits, the figure was 82%.

Just the Facts, Sir

First two reports published so far lean heavily on the statistical side. Much of what was reported was already known, as critics have been quick to point out, but the data, nevertheless, have shed a needed spotlight on some of the murkier aspects of food marketing. For instance, extent of retailer manufacturing, share of output which leading chains represent for individual products, and amount of private label merchandise put up by food makers.

Critics notwithstanding, it's a safe bet to assume that FTC in time will lard its statistics with "interpretations." What the commission appears to be doing is to lay a bedrock of data upon which it will construct findings later.

At least two forces are pushing FTC in this direction. For one thing, food industry matters take up 20% of FTC's budget, and 24 antimonopoly cases in the dairy field keep one-fourth of the commission's antitrusters busy. With one industry responsible for such a big chunk of the outlay, FTC will be hard put to justify the inquiry as a mere data-gathering expedition.

Secondly, powerful Congressional forces want the statistical barebones to be fleshed out with something in the way of legal actions or interpretations. Senator Hubert Humphrey, whose Senate Small Business Subcommittee rides herd on the probe, has pointedly indicated that he would like to see a body of "findings" as well as "recommendations" to government agencies to emerge from the inquiry.

Sharp changes in staff makeup are a fourth factor pointing to greater FTC influence in the food industry this year. Joining the agency will be two experienced probers who have first hand knowledge of the food industry. Chairman Dixon was staff director and idea man for Kefauver's investigation of bread pricing and concentration. And A. Everett MacIntyre, who moves up with the first Democratic vacancy, played the same role in Roosevelt's probe.

The Senate committee's report on its bread inquiry offers possible clues to the course Dixon will chart for the FTC. In its conclusion on pricing policy, the report states: "As more and more independent bakers disappear from the scene, those remaining will become increasingly aware of the fact that their continued existence depends upon following a competitive pattern which meets with the tolerant approval of the major companies." Also, that the "growth in concentration is being accomplished in large part through monopolistic practices by the major national companies in local market areas, and that it is accompanied by the virtual elimination of price competition in any market, which comes to be dominated by the major companies."

Especially significant is the report's comment on the concurrent antitrust jurisdiction shared by Justice and FTC. The committee concluded that, because of its broad Sec. 5 authority, the commission "is the more appropriate agency to undertake a reappraisal of the applicability of the statutes which it enforces in the wholesale baking industry."

Dixon is said to feel that FTC has made sparing use of the ammunition contained in Sec. 5, which broadly prohibits all "unfair methods of competition . . . and unfair or deceptive practices." Thus, you can expect more activity in this direction.

Also, as the idea man for Kefauver's series of investigations into "administered prices," Dixon leans to the theory that where prices are strikingly similar, it's a sign that competition is lacking. Thus, he is likely to look upon the uniform prices that often prevail for such basic goods as bread, milk, citrus juices, and canned foods as fruitful areas of investigation.

Congress Pot Boiling

Congressional probes of the food industry have turned up their quota of suggestions for stronger laws. In the House, Rep. Tom Steed's special subcommittee, which focused on small business problems in the dairy field, wants FTC to have temporary injunctive relief pending issuance of final orders in litigated cases. It also asks for laws requiring sellers to publish their prices, discounts, rebates, allowances, commissions, loans, and gifts.

Even more sweeping are the majority proposals of the Roosevelt committee. One significant proposal calls for beefing up the Packers & Stockyards and the FTC Acts "to prohibit integration of food retailing with meatpacking and other functions of food manufacturing and processing where the effect . . . would be to substantially lessen competition." At the NCA meet, Roosevelt stressed this point, stating that "there is no question that complete integration is so dangerous that its shortcomings outweigh its advantages." (End)

Campbell Researches Future in Food

New Food Science and Nutrition labs help challenge life sciences via basic R&D philosophy. Advances in product, agricultural and container research mark overall operation

THE KEY to much of tomorrow's foods may actually stem from the life science secrets unearthed by basic and fundamental research heretofore neglected by most of the food industry.

According to Dr. C. H. Krieger, Director of Campbell Soup Co.'s just-completed Food Science and Nutrition Laboratories in Camden, N. J., "There is a need for increased basic food research so that product research will not stagnate. We are hoping to help intensify the search for new sources of food and new uses of natural products as food, especially protein."

Judging by the average supermarket, which now handles 6,100 items compared to 3,700 ten years ago, the industry has provided its share of new processing, packaging, and marketing techniques. So it may seem strange to say that the food industry is in the early stages of developing one of its most fundamental areas. Reason is that much research thus far has been directed solely toward commercial product development.

Campbell's advanced program, announced in a refreshingly modest tone, includes investigation into the complex life sciences as a major part of the research and development operation. New labs make possible an expanded Campbell program geared to basic food research complemented by accelerated projects underway in bacteriological research and product development.

To do the job, Campbell spent five years developing the new labs which were completed last month. Located in two separate structures, the old general offices in Camden and a smaller facility in Moorestown, N. J., the labs occupy 39,000 sq. ft. of floor space.

Over 90 scientists, technicians, and assistants staff the labs. Included are 17 Ph. D.s, half of whom work exclusively on basic research investigations in the life sciences. Talented men in the field, many of the lab's personnel were recruited from leading colleges and universities. Dr. Krieger, himself, had served as Director of the Wisconsin Alumni Research Foundation's general laboratories until five years ago when he joined Campbell's to undertake the construction of the new facilities.

Program of basic research is organized into nine specific categories: Nutrition, flavor biochemistry, dairy products, edible fats and oils, flavor chemistry, analytical chemistry, cereals, proteins, and enzymology.

Typical of those involved with basic research is its director, Dr. A. E. Denton. Campbell's research philosophy, which tends to separate fundamental study from actual product development, gives the youthful Dr. Denton and his staff an opportunity to seek the answers to such questions as "Why does chicken meat change its flavor after its temperature reaches 150F.? What natural feeds could farmers provide to give the meat an even more 'chickeny' taste."

Isolation of Flavor

Says Denton, "We hope to some day be able to isolate the chemical components of flavor so as to solve the basic riddle of why beef tastes like beef and chicken tastes like chicken.

RESEARCH DIRECTOR Dr. C. H. Krieger (right), former head of the Wisconsin Alumni Research Foundation's General Labs, talks with Basic Research division chief, Dr. A. E. Denton.

FE Staff

MODERN EQUIPMENT is employed in each of the 20 labs comprising Campbell's new Food Science center. Typical lab (right) employs a molecular still, used in measuring essential fatty acids and other food nutrients. Experimental kitchen (below), one of six in new facilities, is staffed by experienced chefs who assist in new and improved product development.

"Once we know this," he explains, "we may be at the gateway to new knowledge about food, such as how flavors register in the mouth and the extent to which flavor influences digestion and the utilization of food by the body."

Other studies underway include work on the relationship between physiological and psychological factors in digestion and the relationship between calorically balanced diets and obesity. Exploratory work will seek to find out how color and odor may aid digestion.

Basic research is only a part of the sum and total of Campbell's research operation. Working closely with production personnel, intensified product research programs are being aimed at bringing out new products, improving those already on the market, and in developing new methods for processing convenience foods.

During the past year, Campbell introduced over 150 improvements in the 104 products it markets. Changes in both formulation and processing were responsible for these improvements.

As Director of Basic Research and Product Development, Dr. Krieger reports directly to Campbell Pres. W. B. Murphy. The director is mainly responsible for the final decision on research projects, many of which are initiated as outgrowths of existing studies. Production regularly presents new tasks, and new ideas for advanced research often emanate from President Murphy.

Four separate research divisions report to Dr. Krieger—Heat Processed Foods, Frozen Foods, Basic Research, and Bacteriological Research. Except for the bacteriological group, each division has three or four managers handling specific projects. The bacteriological group, headed by Dr. M. F. Gunderson, works with the other divisions in joint projects and is involved with considerable fundamental research.

Agricultural Research

While not a part of the new labs, a most important segment of the total research program is the Agricultural Research division which consists of 10 laboratories and more than a dozen field study locations.

This organizationally separate staff, headed by Dr. S. G. Younkin, includes 55 additional personnel, of whom 30 are plant physiologists, soils specialists, plant breeders, plant pathologists, and horticulturists with advanced degrees.

In agricultural research alone, about 150 major research projects are underway on 22 vegetables in 24 areas.

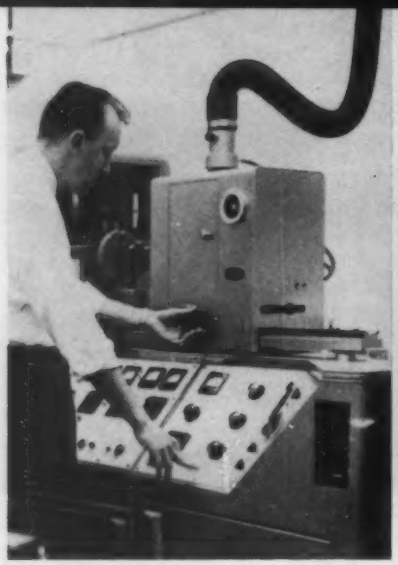
Included are projects aimed at ways to widen the climate tolerances of food plants, breed additional disease-resistance into plants, and increase knowledge about crop rotation, fertilization, soil preparation, and other cultural problems. In all, some 22 crop problems are being investigated.

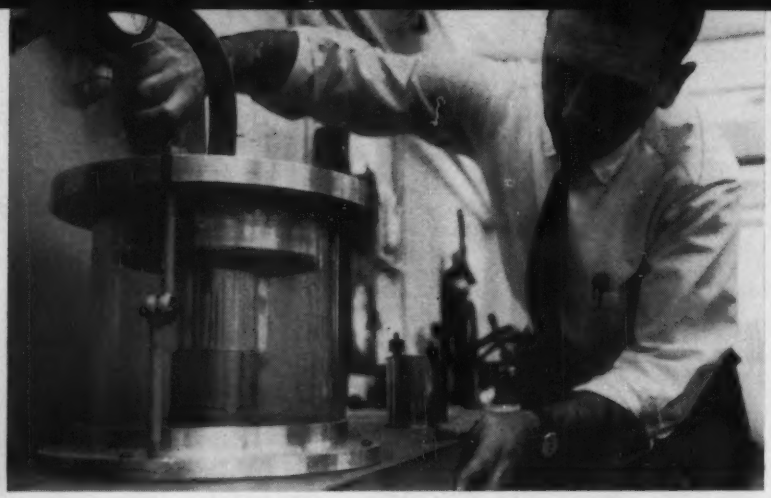
Separate again from both product and agricultural research is the Container Research Laboratory. Knowledgeable Dr. H. S. Van Vleet directs this operation which is an adjunct of the can-making operation. Campbell is the country's third largest can manufacturer.

Since 1955, Container Research labs have been carrying out research in all phases of packaging, from the tin can to the flexible pouch to the aluminum container. Additional research has provided developments in shipping containers and fiber packages. Notable was the now-popular "tray-pack" shipping carton introduced last year for Campbell's soup line.

New Lab's Highlights

While no formal opening ceremonies were held at the Food Science labs, FE editors had an opportunity to tour the new facilities and talk with the men responsible for directing the overall Campbell research operation. (turn page)





CONTAINER RESEARCH: Emission spectrophotometer (left) speeds and simplifies qualitative and quantitative analysis of metals, particularly in pinpointing trace elements. Researcher (above) uses blow-up test to gage can's side-seam strength.

Briefly, here are some of the research objectives and activities of the new lab:

Flavor Chemistry — Better understanding of the chemical basis of product flavor, how it is developed, what happens to it during processing and storage, and why —are the principal aims.

Admittedly, this is a large order and the problems are highly complex. However, such fundamental information would enable tremendous improvements in every phase of food production. It opens the door to genetic tailoring of raw materials for desired properties, far more effective process control, and better preservation of product quality.

The basic task in this research is isolation and identification of flavor constituents with such advanced analytical tools as the vapor-phase chromatograph, and infrared and ultraviolet recording spectrophotometers. Enzyme activation of flavor precursors is also of interest.

Flavor Biochemistry—Here, research is concerned with the mechanisms of flavor sensation—why foods taste as they do. Subjective evaluation is accomplished largely through advanced taste-panel techniques, such as the 'flavor profile.' The test area is humidity controlled. And when desired, special lighting eliminates the factor of food color.

Nutrition — To offer foods of maximum nutritive value, Campbell is seeking information on how the body can use food more efficiently. Studies of how food nutrients act as energy suppliers, and as bone and muscle builders, involve use of tracer elements and a scintillation counter. Proteins and their amino-acid balance are of particular interest.

Cereal Products—A typical research task which Campbell hopes to undertake is the investigation of durum wheat properties that indicate wheat's use in some of its products. This knowledge would give Campbell greater flexibility in raw-material selection when durum wheat is in short supply. Typical of advanced instrumentation on hand for use in this lab is the amylograph, which is used in rheological studies.

Fats and Oils—Here, the emphasis is on storage stability of liquids. Techniques for accelerating the deterioration of fats and oils enable study of the mechanisms of rancidity and evaluation of preventive measures.

Dairy Products — Research in this area is concerned largely with factors that cause changes in dairy products during processing.

Frozen Foods

In low-temperature bacteriology Dr. Gunderson's group is doing outstanding research on the roles of psychrophilic bacteria and their endo- and extracellular enzymes in quality losses of frozen foods. Another area of interest is the temperature variations of products in commercial display cabinets.

This work has shed much needed light on the safety of properly processed frozen foods. In fact, a recent bacteriological survey of precooked frozen items revealed that they had far better microbial records than most other items found in the supermarket's perishable section. Conducted in cooperation with the National Assn. of Frozen Food Packers, the survey included such ready-to-heat-and-serve foods as beef and chicken pies, and turkey pies.

Particularly significant from this research is the fact that the true melting points of frozen foods can range from a low of 15F. to a high of 30F. Such data are basic in any evaluation of proper product-storage temperature because both bacterial growth and enzymatic degradation require the presence of free water.

Because a frozen food should be held below its melting point, display cases should maintain zero-F. temperature to insure a hard-frozen product.

Also important is the growth rate of deleterious organisms at various storage temperatures.

Scientists have shown that even at defrost temperatures, frozen foods are not suitable growth media for organisms of public-health significance. This is not to say, however, that quality losses will not take place at defrost temperature. Enzymes of psychrophilic bacteria are active at this temperature whether the viable organisms are present or not. The resulting degradation renders the product unacceptable and, in that sense, frozen foods have a built-in defrost indicator.

Improved Vitamin C Assay

Nearing final development in the analytical lab is an improved polarographic method for Vitamin C.

In general, polarography is superior to the conventional indo-

Industry to Boost Lagging R&D Expenditures

CAMPBELL'S research activity symbolizes the start of a surge in food industry expenditures for R&D. In the past, volume spent has lagged well behind other industries.

A recently-released National Science Foundation study (Funds for Research and Development in Industry—1957) reports that food and kindred products spent only $68 million of the $7.2 billion laid out by all manufacturing industries in '57.

As a percent of sales, food applied just 0.3% toward R&D compared to 1.6% average. Even this was a 16% increase for food over the previous year. And 83% ($56 million) was spent by food firms with 5,000 or more employees.

Only 3% ($241 million) went for basic research by all industries while 97% was poured into applied research and development. Some 5% ($3 million) of food research expenditures were charged to basic; 38% to applied; and 57% to development.

Only 10% ($24 million) of the total 3% was spent for basic research in the life sciences. Physical and mathematical sciences had 54% ($115 million) and engineering had 36% ($86 million).

Performance cost per R&D scientists and engineers averaged about $20,200 in the food industry, compared to an overall manufacturing average of $34,000. Payroll costs per scientist and engineer were also lower for food ($7,900) than the average ($8,900). Actually, average R&D salaries in food were survey's lowest.

In '59, NSF classified 3,700 as scientists and engineers in food industry R&D. In all manufacturing, 254,400 were placed in this category.

More recently, according to the McGraw-Hill Study of Growth of Research & Development Expenditures, the food industry laid out $97.2 million in '59 and expected to approach $110.8 million in '60. This study showed the '59 food figure to be only 0.18% of sales compared to 2.43% for all manufacturing.

But now, with big food firms like Campbell, General Foods, and Heinz leading the way, food R&D should spurt. According to Campbell President Murphy, it is estimated that the industry will be spending about 40% more in '63 than was spent in '59. Alone, Campbell estimates it spent $6½ to $7½ million for research in '60, according to outside sources.

phenol titration for ascorbic acid because of its higher selectivity. The method is based on the principle that the type and quantity of electro-reducible and oxidizable components of a solution can be determined from current-voltage relationships established with a mercury electrode.

The link between research and production at Campbell is a new pilot plant well equipped to evaluate new products and processes. Complete canning and freezing lines can be assembled to stimulate actual production operations.

An interesting feature of the two-story structure is an opening between floors that can accommodate tall equipment or vertical conveyor systems.

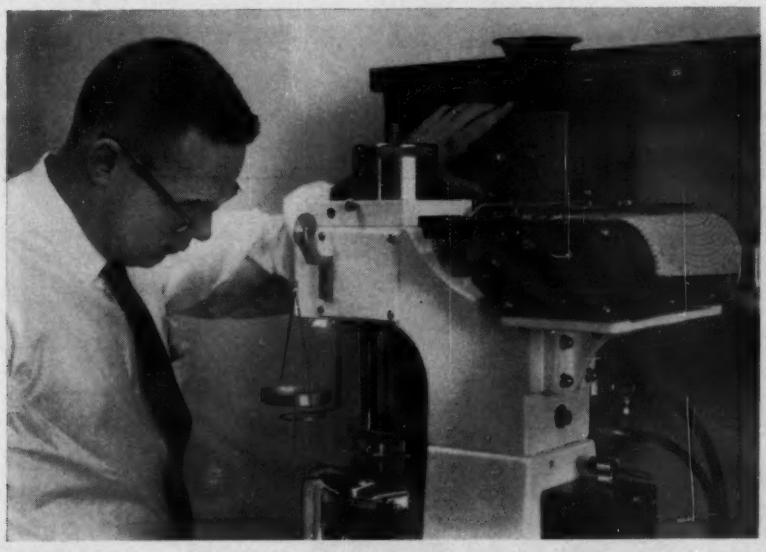
Backs College Research

Campbell Soup knows that industry alone cannot fully explore the secrets of the difficult life sciences. In addition to discoveries expected in the Campbell labs, plus those made in other food industry research centers, many of the breakthroughs are expected to come from the colleges and universities.

Consequently, Campbell has followed a program of direct and indirect aid to education that has provided slightly more than $4 million to schools throughout the country. Just recently, Massachusetts Institute of Technology announced an unrestricted $1,000,000 gift from Campbell, the largest unrestricted grant the Institute ever received from industry. Ten years ago, Campbell provided a major grant toward the cost of MIT's John Thompson Dorrance Building of Biology and Food Technology.

In '60, California Institute of Technology dedicated a Campbell Plant Research Lab to the task of making it possible for plants to grow in a wider variety of climates. The University of Wisconsin also announcer receipt of a $189,800 gift to help build and equip a genetics research building.

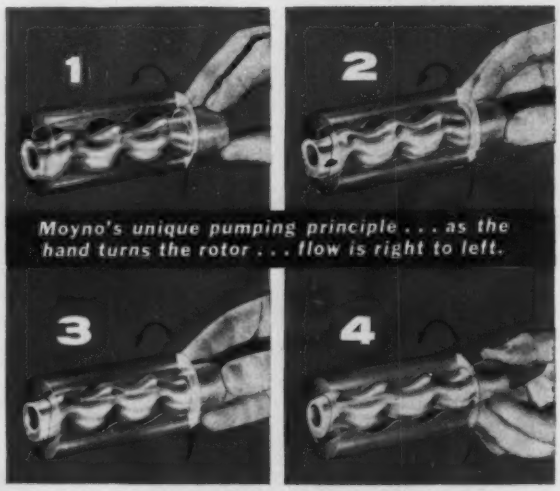
Fellowships in Food Technology have also been provided at the University of Illinois, MIT, Oregon State, Purdue, California, and Wisconsin. Fellowships in Plant Sciences have been established at Cornell, Illinois, Iowa State, and Purdue. Specific research and development projects are underway at California Institute of Technology, Maine, Michigan State, North Carolina State, Texas A & M, Utah State, West Virginia, and Wisconsin. (End)



AMYLOGRAPH is an instrument which will be used for research projects to gage and record solution viscosity.

MOYNO® FOOD PUMPS *help the Green Giant keep the kernels whole!*

He's very fussy about the appearance of Niblets Brand corn, so Green Giant Co. uses Moynos to keep the tender kernels whole. Moyno's "progressing cavities" move all foods smoothly, without disintegration, pulsation, aeration or agitation! Variety ranges from thin soups to heavy peanut butter to chunky potato salad. Moynos keep foods pure, too! All wettable parts, except stator, are stainless steel. Stator can be stainless, synthetic rubber, odorless bakelite or other material. Smooth pumping elements can't lodge particles where bacteria might thrive. And Moynos can be dismantled, cleaned and be back on duty in minutes! Moyno food pumps are available in five sizes with capacities to 175 gpm and pressures to 75 psi. Write today for new Bulletin 100-FE.



Moyno's unique pumping principle . . . as the hand turns the rotor . . . flow is right to left.

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Fractional and Integral HP Electric Motors • Electric Hoists and Overhead Traveling Cranes • Moyno® Industrial Pumps
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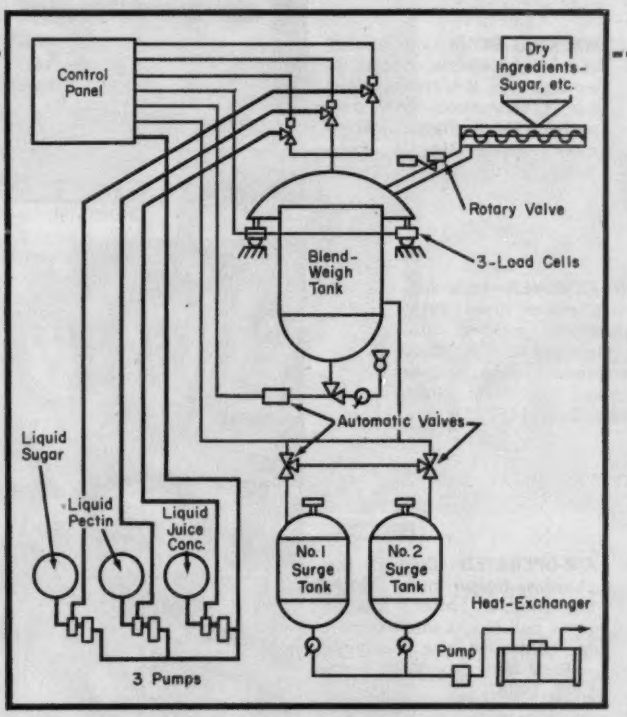
Subsidiary companies at: Memphis, Tenn., Pico Rivera, Calif., Brantford, Ontario.

At Canners Show—

19 NEW UNITS

For Better Processing . . .

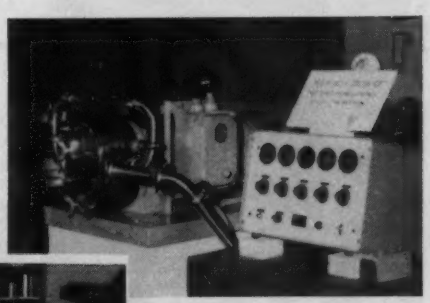
. . . Featuring advanced systems and equipment for automatic batching, ingredient feeding, trimming and coring, separating, cleaning, container handling, and packaging

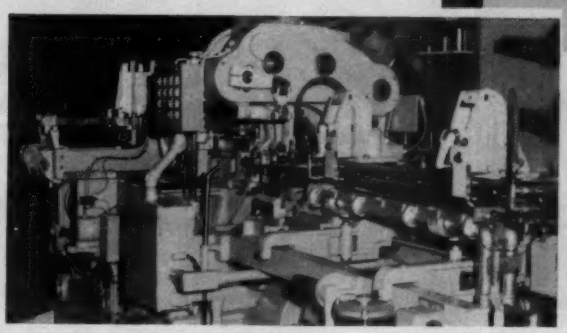


AUTOMATIC BATCHING of preserves features sequential feeding of dial-selected ingredients into blend-weigh tank supported on load cells. Blended batch goes to surge tanks, heat-exchanger, and cooker. Sanitary valves are air-actuated from control panel.—Cherry-Burrell Corp., Cedar Rapids, Ia. (421)

CONTINUOUS FEEDER proportions wet or dry ingredients into product stream —pimento into corn, crunch into peanut butter, etc. — Creamery Package Mfg. Co., Chicago. (422)

3 Control Systems & Can Maker





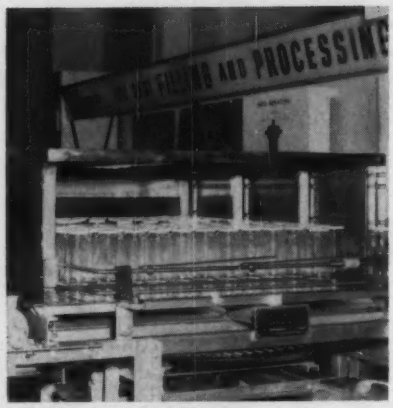
▶ **ALUMINUM-CAN MAKER** side-seam cements aluminum bodies for citrus concentrate at 450/min.—E. W. Bliss Co., Canton, Ohio. (423)

▲ **SANITARY METERING PUMP** (dual head) handles fluids and semi-fluids with ½% accuracy. Counter tabulates pump revolutions and stops pump at end of preset cycle. — Waukesha Foundry Co., Waukesha, Wis. (424)

At CANNERS SHOW (continued)

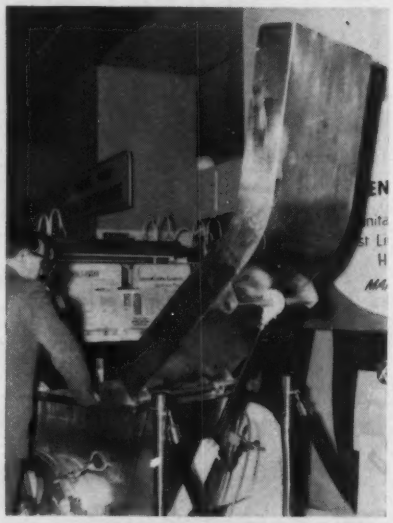
6 Processing Units

FOAM CLEANER'S double-deck dewatering screens handle 10,000 lb. of whole-kernel corn per hr. Product is ready for filling into cans.—Geo. J. Olney, Inc., Westernville, N. Y. (425)



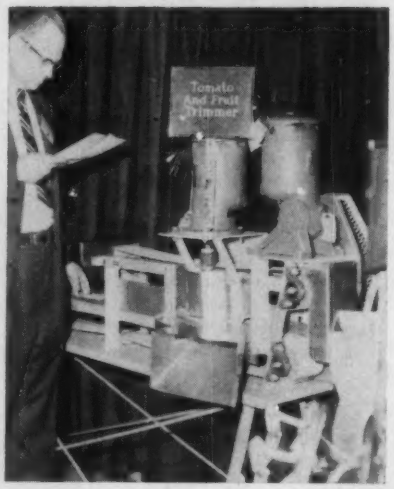
WALKING BEAM unit acts as cooler, pasteurizer - cooler, or exhaust box. It features infeed bar synchronized with deck and special discharge arrangement.—Horix Mfg. Co., Pittsburgh. (426)

SLIVER REMOVER separates undersize pieces from strip-cut potatoes, pickles, etc. Unit's stainless-steel shuffles deliver product onto belt.—Magnuson Engineers, Inc., San Jose, Calif. (427)



AIR-OPERATED CHUTE discharges frozen meat blocks into chopper. Latter's rotating arms pull blocks into machine for controlled size reduction. —Rietz Mfg. Co., Santa Rosa, Calif. (428)

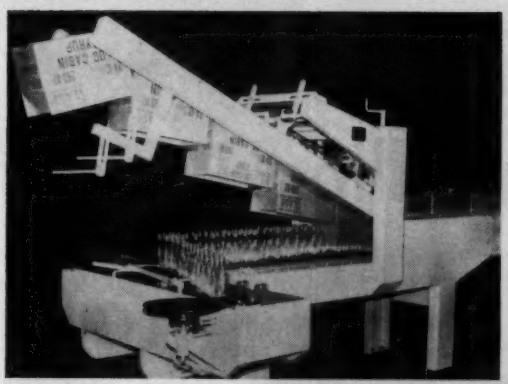
CORER for peeled tomatoes (with stems) adjusts to varying core depths while unit is operating. It handles small and large sizes. — Magnuson Engineers, Inc., San Jose, Calif. (429)



SANITARY fruit trimmer has spring - loaded, product - positioning belt. Trimmed fruit drops onto main belt, waste is deflected to a trough.—F. H. Langsenkamp Co., Indianapolis. (430)

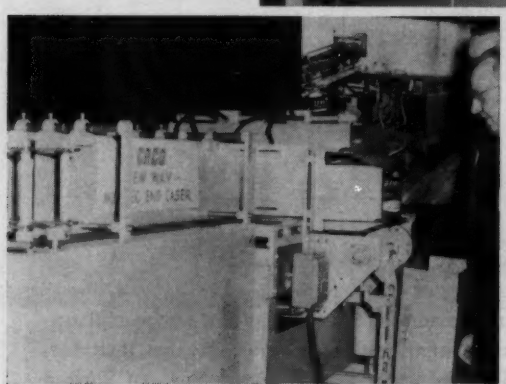
For more data, circle item number on Inquiry Card, back of book

4 Container Handlers

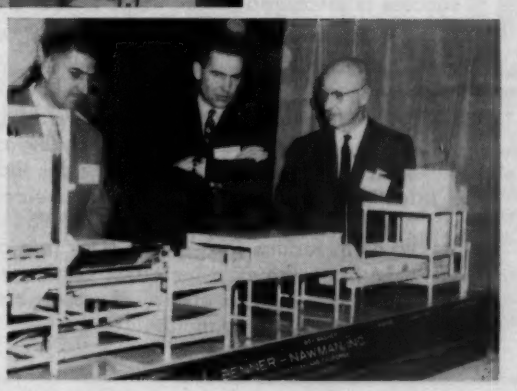


CASE UNLOADER and single-filer handles 600 containers/min. Unit's inclined belts lift case from containers, which are delivered single-file to a take-away conveyor. Empty cases go to casing station.—MacArnett Engineering Co., Santa Clara, Calif. (431)

CASE SET-UP MACHINE (right) feeds, erects, and positions shipping cases for can- or package-loading by end-open caser (left). Vacuum cups strip bottom flat case from magazine at speeds up to 30/min.—Food Machinery & Chemical Corp., San Jose, Calif. (432)



END CASER for all flat-top containers, except glass, operates at 25/min. Cans enter unit upright for live-roller transfer through pack-arranging divider. Operator trips unit as case is placed over discharge basket. — Chisholm-Ryder Co., Hanover, Pa. (433)



LUG-BOX handling system automatically dumps products such as boxed tomatoes into flume or onto conveyor. Boxes are depalletized, inverted for dumping, conveyed through washer and inspection belt, then re-palletized. —Benner-Nawman, Inc., Oakland, Calif. (434)

5 Other Highlights

★

PNEUMATIC CAN ELEVATOR, with two vertical belts adjustable to various can sizes, transfers cans (from cooler, for example) to a spiral lowrator.—Peco Corp., Mountain View, Calif. (435)

★

FLOATING roller-type magnet, counterbalanced over product-conveying belt, is self-adjusting for height above belt. This prevents damage to such fragile items as cut corn, fruit cocktail, etc.—Columbia Engineering Service Co., Santa Rosa, Calif. (436)

★

AIR-ACTUATED VALVES, in on-off and changeover types, has protruding spindle that shows valve-head position. A switch can be fitted to valve's top and operated by extended spindle for remote indication or electrical interlocking with other equipment. —A.P.V. Co. Ltd., Sussex, England. (437)

★

BOOSTER HYDRAULIC JET, permanently mounted, delivers 4,000 gph. of hot liquids or detergent solutions at double the input steam pressure (above 50 psi.) and at temperatures to 190F.—Sellers Injector Corp., Philadelphia. (438)

★

EXPENDABLE, low-cost carton holds 30 lb. of frozen fruit. Compact unit has fiberboard body metal-secured to paper-board bottom. It is easily filled, with or without polyethylene liner.—Owens-Illinois, Toledo, O. (439)

Here's a simple sampling system that prunes packaging costs by weeding out defective containers before they reach the operations stage

Keeps Rejects From Reaching Filling Line

STATISTICAL quality control gives you an effective check on incoming packaging materials to make sure that only top-flight containers reach your filling lines. At the same time, it simplifies your container inspection program and reduces costs.

One of the important tools of SQC is acceptance sampling procedures. Here is a simple method for applying such a technique to metal cans, but the principles may be adapted for other packaging materials.

In supplier-user relations, there is always the question of material acceptance. With the application of SQC, statistical samplings offer the best means of obtaining authoritative answers. Statistical procedures have their costs, too, and must be weighed against anticipated benefits. The cost of the inspection plan to the user should not exceed the expense which he would incur if the inspection were not done.

Take Your Choice

There are a wide variety of acceptance sampling plans you can choose from. Readily available are the Military Standards 105B and 414, the Dodge-Romig Tables, for instance.

Even more important than statistical considerations are such questions as:

1. **What constitutes defective material?**
2. **What quality level is acceptable?**
3. **What risks are you and the supplier willing to assume that a wrong decision may be made?**
4. **How much are you willing to spend to obtain the desired protection?**

For acceptance sampling to work successfully, you and the supplier must agree on definitions. For example, defects and tolerances must be mutually defined for common understanding.

Both parties should have actual examples of agreed upon defect classifications for ready reference. Also, the manner of sample-selection is important because conclusions will be meaningless unless they're based on samples chosen at random. Experience shows that sometimes a considerable period is required, while the sampling plan is in operation, for complete agreement to be reached on definitions, acceptable quality levels (AQL's), and the like.

A sampling plan that makes for mutual understanding between supplier and purchaser briefly states the packer's can requirements, then spells out in detail the sampling plan. "Lot size" is defined, and the producer's risk set at 5% (i.e. the supplier accepts the risk that a "lot" of acceptable cans may be rejected as often as 1 time out of 20 by the sampling scheme).

Sampling procedure states the number of cans to be examined, acceptance number to be used, and spells out the system to be followed to obtain a random sampling.

Here's One Way

For example, take as a "lot" a truckload delivery of 303 x 406 cans consisting of 32 pallets of 2550 cans each, or a total of 81,600

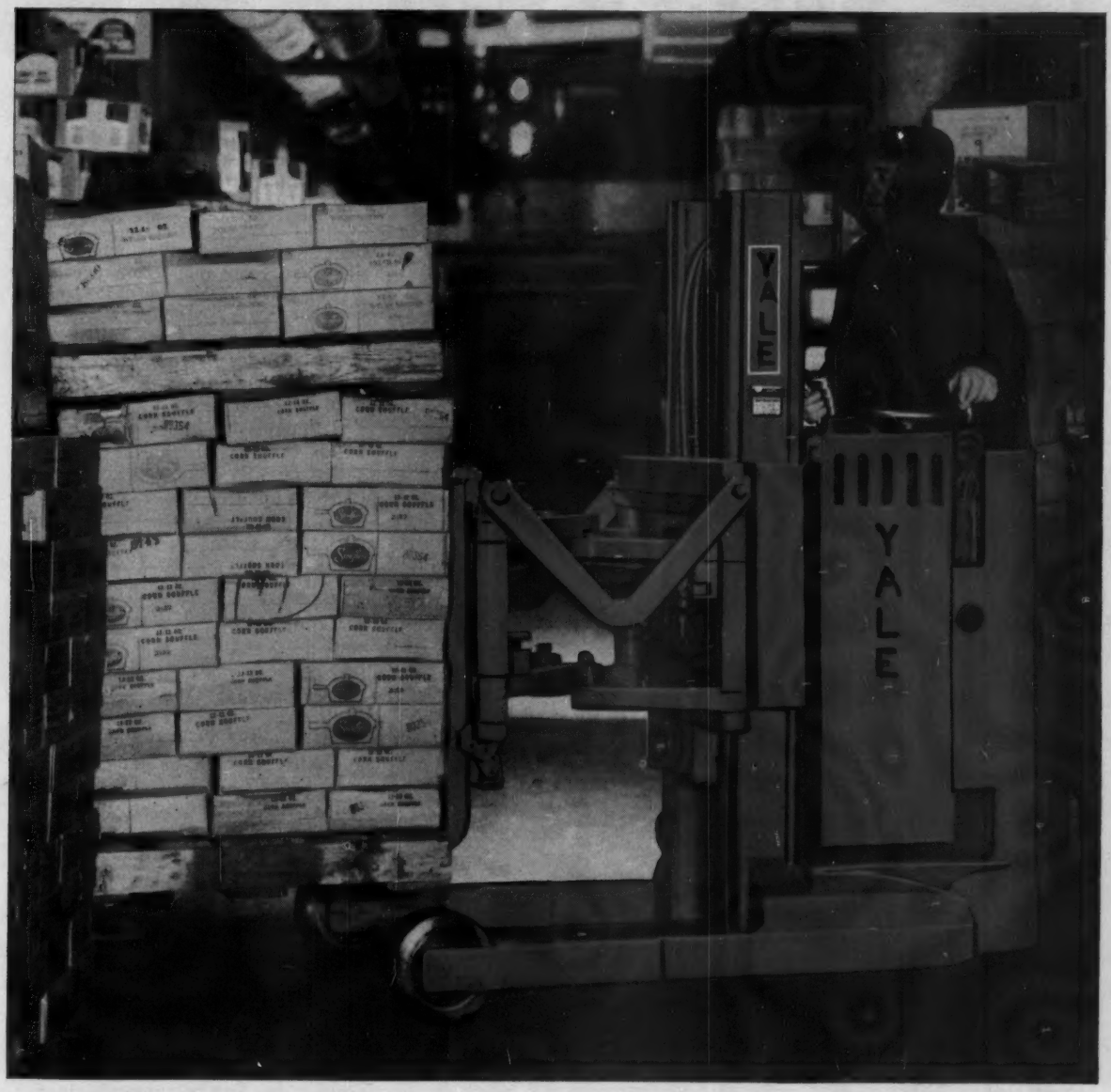
Economics of Quality Control

There are abundant examples illustrating the successful application of acceptance sampling techniques. In this instance, success is measured in economic terms. Irving Burr, of Purdue Univ., in his book, "Engineering Statistics and Quality Control," puts it this way:

> *"Sound sampling consists in deciding what protection we desire, then finding what sampling costs are entailed by a sampling plan which provides that degree of protection. If the sampling costs are deemed excessive, then the degree of protection must be relaxed to some extent so as to reduce the sample sizes and costs, and a new sampling plan must be found. In this way, an economic balance is struck between the costs of wrong decisions and the costs of sampling."*

S. J. HOTCHNER,
Western Area Laboratory, American Can Co.

save space you can't afford to waste



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Cost of 5" x 8" x 10" chipboard carton printed in one color and purchased in 500 M quantity $0.035
Cost of Kraft paper for bundling product of the above dimension printed in one color by a Hayssen printer attached to paper roll stand $0.004
Total material savings of 88%

Typical installation of a Hayssen Accumulator and Bundler.

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cans. Military Standard 105B single-sampling scheme for normal sampling (Level II) calls for a total sample size of 450 cans.

The scheme for normal checking of 32 items calls for a sample size of 7. Then, according to the plan, 7 is divided into 450 to give, as the procedure in this instance, the selection of 64 cans at random from each of 7 different pallets. Acceptance and rejection numbers will depend on the AQL that applies.

The sampling plan should then describe the inspection procedure and provide for mutual supplier-buyer review of questionable lots. Included would be the AQL to apply and the list of defects with a clear definition of the barely-failing degree for each.

Such a plan can be used for visual inspection wherein the cans are classed as acceptable or not acceptable. It could be applied to such attributes as lithography and enamel defects, side seam or doubleseam defects (i.e. open laps or side seams, excess solder, cutovers), physical damage, and contamination.

A similar parallel plan can be developed for variable inspection using actual measurements. **The advantage of a variable plan is that, in checking the dimensional quality of cans or ends, it is not necessary to inspect as large a sample as required for visual defects.** Since a measurement shows an exact numerical relationship to a dimensional specification, observation of a small group of measurements usually provides a satisfactory picture of the whole lot.

Trust Each Other

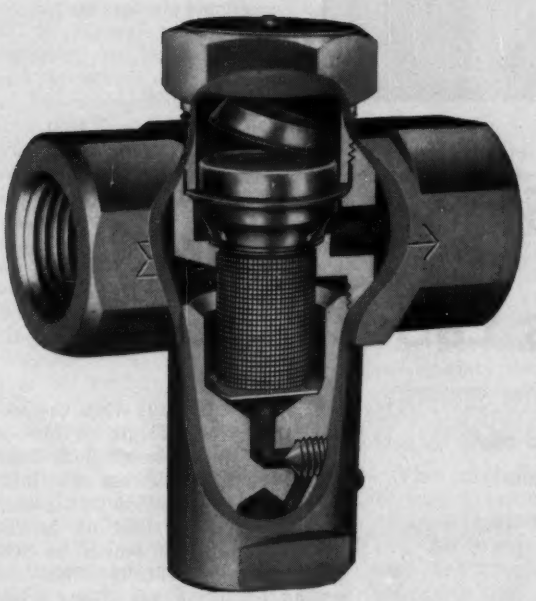
In essence, mutual exchange of information between supplier and user renders acceptance inspection on individual deliveries unnecessary. Instead, random spot checks, on a greatly reduced basis, can be performed on delivered material to discover any trends toward lowered quality.

This is the most practical approach for the can user since statistically adequate sampling of each shipment is far too costly. Inspection of occasional — instead of all—deliveries will often serve the desired purpose, particularly if the supplier consistently maintains a good level of quality.

Article based on a talk before the Northern California Section, IFT.

(End)

NEW YARWAY SERIES 130
IMPULSE STEAM TRAP



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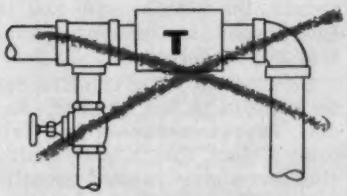

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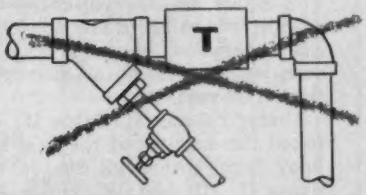

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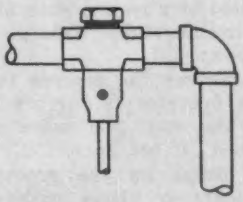

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DURING STUDY, observer stands in position providing full view of operation. Technique is easily handled by a person without previous experience.

Fast and Easy Job-Study Improves Labor Efficiency

Easily-applied occurrence tabulation method of studying job performance can help you re-allot excessive manpower. Speedy, low-cost technique has high worker acceptance

LABOR EFFICIENCY and utilization can make a big difference in your profit per sales dollar. In a large company, an extra person on the payroll may increase the labor cost per unit but in smaller firms it can easily mean a loss.

One method of checking labor utilization is the occurrence study technique for analysis of repetitive or non-repetitive work of humans, rather than machines.

Technique is simple and can be applied by a person without training in time study. Procedure is as follows:

1. Survey the process to see if each operator is performing his job the way you want it performed. If not, correct it.

2. Break up the process into elements or pieces with definite beginning and end points. For instance, if your process were hand-filling pints of ice cream from a continuous freezer, a typical element might be filling cartons. This would consist of taking an empty, set-up carton, putting it over the filling boot, filling it, removing it when full and setting it on the table.

3. Set these elements at the top of columns on an observation record sheet as shown in Table I. Make one of these column headings "Miscellaneous" or "Idle Time" under which is recorded all observations of any person not performing a useful element.

4. Select an observation post at a point where all of the operators and operation elements can be seen without the observer moving from the post.

Under column I (Table II) are listed the minutes of the first half hour from 1 through 30. In columns II, III, and IV, under first half hour are numbers which represent seconds in each minute. In column II it will be noted that all numbers are between 1 and 20. In column III all numbers are between 21 and 40, and in column IV, between 41 and 60. If in the first minute an observation is made when the sweep second hand reaches 7, that is the seventh second; another is made when the second hand reaches 25; and a third at 48. Then, three observations shall have been made in that first minute. After observation at the 48th second, he goes right on to the second minute, in which he will make an observation when the second hand reaches 4, one when it reaches 29, and one when it reaches 41. Observer continues this pattern in the succeeding minutes through thirty minutes. At such time he shall have made three observations per minute for thirty minutes, or a total of 90 observations for each person on the operation.

He then goes to the first minute of the second half hour and continues under columns V, VI, and VII, observing in the first minute of the second half hour at the 5th second, the 26th second, and the 44th second, in the same manner that he did during first 30 min.

Numbers in these columns bear no relation to one another. Random figures eliminate the false total picture that might result if studying a synchronized operation with a regular pattern, i.e., every 20 sec., 40 sec., 60 sec. Intervening elements would not be observed since the same element might be seen at each succeeding observation.

5. Start the watch and when the sweep hand arrives at the times listed on the random time sheet, observe which element each

R. A. KEPPELER, C. W. HALL and P. J. THORSON
Depts. of Agricultural Engineering and Mechanical Engineering, Michigan State University.

member of the crew is performing and put a mark in the column under those elements noted as is shown in Table I. Repeat this procedure until the run is finished. Also, note the exact length of time the operation runs and the number of units produced during this time.

6. A leveling factor may be used to rate the performance of the operators, i.e., whether they are working at a normal pace, faster than normal, or slower than normal. A normal pace is usually considered to be equal to the speed at which a person might deal 52 cards in 27 seconds, or walk 100 feet in 21 seconds. Performances slower than those standards are rated as decimals less than one, and faster performances as decimals greater than one. Performances that are the same as the standard would be given a performance rate of one.

At the end of the study the ratings are averaged and that average becomes the leveling factor to be used in the calculation of basic times.

7. After about 550 observations, approximately 3-hr. at three observations per minute, total all the marks under each element and obtain the grand total for all elements of the operation. Compute the percentage of times each element occurred by dividing the element total by the operation total. This is an estimate of the percentage of occurrence of each element of the total operation.

8. Compute the number of observations needed to assure statistical reliability at the 95% level by using the following formula:

$$N = \frac{4p\,(1-p)}{.0016} = \frac{p\,(1-p)}{.0004}$$

Where N = number of observations needed

p = % of occurrence.

If an element occurs 25% of the total observations, and the study needs to be correct within 4% at a reliability level of 95%, then

$$N = \frac{.25\,(1-.25)}{.0004} = \frac{.25 \times .75}{.0004} = 469$$

This is the minimum number of observations to be permitted for this element. Make this computation for each column of elements.

9. Continue observations until the required number has been tabulated for each element. When the observations are complete, retotal the observation sheets and re-calculate the percentage of occurrence of each element.

Use of Data

The percent of occurrence can be used to calculate the basic time of an element and the basic time can be used to calculate the standard time of an element. The standard time is defined as that time plus allowance that is needed to accomplish that element at the maximum pace an individual can work day after day without harmful effects. Total of all the standard times of the useful elements (not including the miscellaneous or idle time) is the standard time for the total operation. These standard times can be used for a number of different purposes, such as:

► **Determining the length of time needed to produce a given number of units.** For example, if the standard time for a gallon in pints of ice cream were 0.200 min./gal., then 60 min. divided by 0.200 min./gal. is 300-gal./hr.

► **Determining the operating efficiency of a department.** For example, if pints of ice cream had a standard time of 0.20 min./gal. and half-gallons of ice cream a standard time of 0.06 min./gal. and during an eight-hour day 1100 gal. of pints and 3300 gal. of half-gallons were produced, then the operating crew would have earned 418 minutes for the 480-minute day, computed as follows:

1100 at 0.20 = 220 min.
3300 at 0.06 = 198 min.
418 min.

The 418 minutes which the production crew had earned divided by the 480 minutes of actual time used would equal 87.1%.

$$\frac{418}{480} = .871 \text{ or } 87.1\%.$$

This is a measure of department's efficiency.

(turn page)

OBSERVATION TABULATION SHEET

	Place Cartons In Dispenser	Filling	Close And Place In Bagging Shoe	Bag And Tape	Stamp Bags	Place Bagged Pints On Conveyor	Check Weigh Filled Pints	Freezer Control	Fruit Feeder	Miscellaneous	Get Stock
	𝍸 𝍸 III	𝍸 𝍸 𝍸

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► **Re-apportioning the work among the various members of a crew.** If one person has more work than another person, perhaps the elements can be arranged into a different sequence so that the total time of elements performed by one person will be very near equal to the total time of elements performed by other persons.

► **Revising wage incentive systems.** The study could be a valuable tool in re-evaluating standards within a general incentive overhaul.

► **Estimating costs.** When the manager knows his labor costs per hour, overhead costs, supervision costs, etc., he can, by multiplying the standard time times these costs, determine what one unit costs when finished. For example, if three people at $2/hr. produced ice cream pints which has a standard time of 0.20 min./gal., then the cost per gallon of their labor would be

$$\frac{3 \times 2.00 \times 0.20}{60} = .02 \text{ or } 2¢/\text{gal.}$$

Computation Methods

The basic time of an element equals the total number of minutes that the operation ran times the leveling factor times the percentage of occurrence, all divided by the number of units produced in that total operation time. For example, if the operation ran 9 hours with a leveling factor of 0.90 and the percentage of occurrence was 25% and the number of units produced were 2430, the calculation would be:

$$\text{Basic time} = \frac{9 \times 60 \times .25 \times 0.90}{2430} = .05 \text{ min./gal.}$$

To calculate the standard time for this unit, first compute the allowance factor. If two fifteen-minute rest periods and 20 minutes clean-up time are allowed in an eight-hour day, the allowance would be 50 min./day.

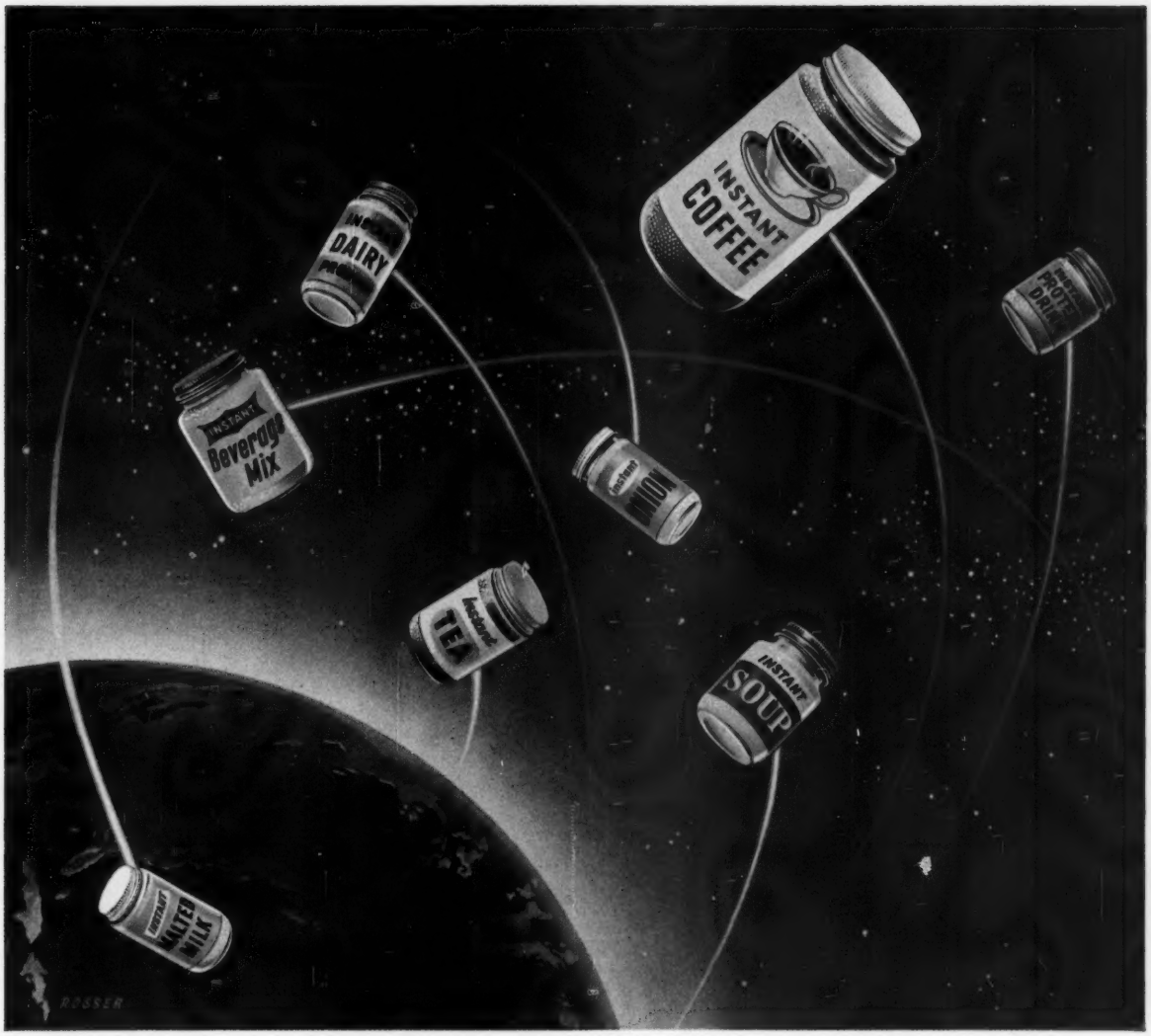
The allowance factor is computed:

$$\frac{50}{480 - 50} = \frac{50}{430} = .116$$

The standard time would equal the basic time, multiplied by one plus this allowance:

$$\text{Standard time} = (1 + .116) \times (.05) = .056 \text{ min./gal.}$$

(End)



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So many instants go to market in Duraglas Containers:

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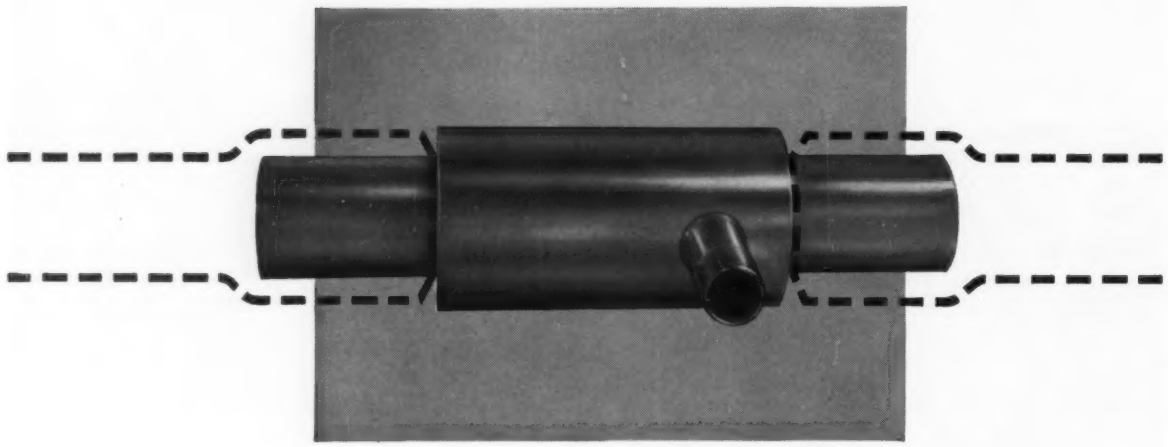

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This new unit can be used wherever you want to measure a line temperature. A quick-connect plug or plug jack on the thermocouple wire lets you use up to 24 units for measuring as many points with one *ElectroniK* multi-point recorder. It's ideally suited for clean-in-place methods.

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CIRCLE 54 ON INQUIRY CARD

CIRCLE 55 ON INQUIRY CARD →

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Plain Slices

Corrugated Slices

OPERATING PRINCIPLE

The product to be cut is dropped into a hopper through which it feeds onto two high speed conveyor belts, each sloping inwardly to form a "V" cross-section. • A third conveyor belt then comes down over the top to complete the product enclosure. • Thus, the product enters the slicing wheel completely surrounded by moving conveyor belts and slicing wheel corrugated rolls which insures its positive feed into the knives. • This action virtually eliminates plugging of the machine, and, since the feed to the knives is positive, "thin" slices occur infrequently. • The new unit is so positive in its feeding action that it will feed leafy products easily. • The "V" shape formed by the belts keeps the product in constant alignment with the cutting knives regardless of product diameter, practically eliminating "bias" cuts.

- *Positive* feed action.
- No product crushing.
- Practically eliminates "thin" or "bias" cuts.
- Cuts thicknesses from 1/16" to 1-1/3".
- High capacity feeding with maximum cutting yield.
- Compact—engineered for long dependable service and low maintenance.

PRECISION HIGH-SPEED FOOD CUTTING EQUIPMENT

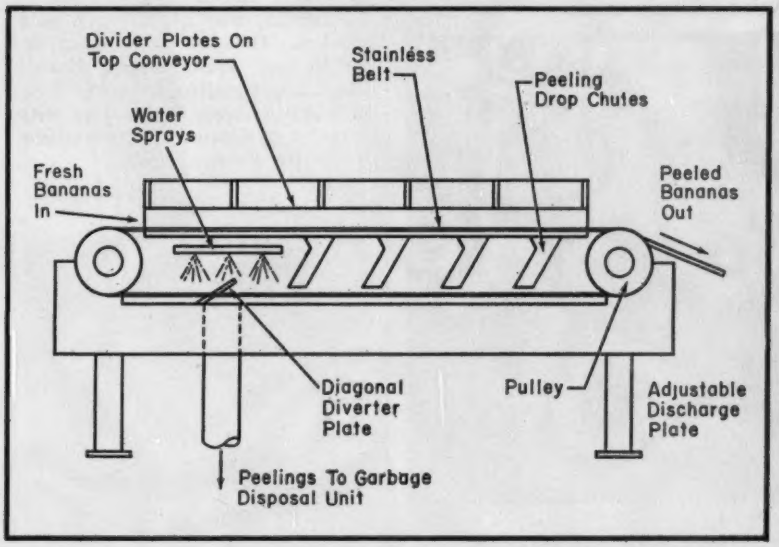
URSCHEL
LABORATORIES INC.
VALPARAISO, INDIANA

Designers and manufacturers of precision high speed cutting equipment for food products

practical ideas

Truck safety signal . . . Boost cooling efficiency . . . Cut roofing costs

TRIPLE DUTY CONVEYOR SYSTEM SIMPLIFIES FRUIT HANDLING OPERATION



At the Kitchens of Sara Lee, Inc., Chicago, a 1½x20-ft. stainless steel conveyor belt was recently installed for hand-peeling of fresh bananas used in the company's all-butter banana cake. Problem was to develop an efficient conveyorized fruit and discarded-peel handling system.

Solution was to mount two stainless divider plates (¼x3 in.) over the top of the conveyor so that unpeeled bananas could be conveyed along the two outer portions of the belt, each side flanked by four girls. Peeled bananas are then placed on center portion of belt that conveys them to an adjustable discharge plate for feeding into a variety of different size stainless steel containers.

To simplify the handling of peelings, four inclined drop chutes (1x2x8 ft.) at each girl's station discharge waste on top of return section of stainless belt. Just before belt returns to 2 ft. dia. feed pulley, a metal plate diagonally mounted over return belt portion diverts peeling into a chute feeding an automatic garbage disposal unit. Ground waste is then flushed to the sewer. Meanwhile, belt's continuously cleaned as water (from three nozzles) is sprayed onto it just above the divertor plate.—*FE Staff*

Vibratory Proportioning

Replacing manual feeding of an additive to rock salt, this vibratory feeder (Eriez Mfg. Co.) is used by Morton Salt Co., Detroit, for uniform proportioning. Regulated at a pre-set rate of feed, unit adds the proper amount of additive as salt passes below on a conveyor.

Liquid Nitrogen Boosts Truck-Cooling Efficiency

Liquid nitrogen has been used successfully to maintain low air temperature in a frozen-food distribution truck.

Employed to dispense the nitrogen is a simple spray system consisting of a supply tank and a single pipe running along the ceiling from front to rear. Sprayed directly on the load, the liquid nitrogen flashes into a gas that expands some 700 times to force warm air out of the truck. Once established,

Light Signals Back-Up

An extra safety precaution in our confined warehouse space is this back-up light (arrow) recently installed on fork-lift trucks.

The red-flashing light goes on when driver shifts truck into reverse, thus alerting personnel and drivers of other trucks.—*Joe Menendez, Safety Director, Falstaff Brewing Co., St. Louis.*

Monile unharmed by multi-ton steel wheel paper trucks since 1957.

MONILE COPOLYMERIZED FLOORS resist spalling and crumbling under heavy trucking ...hard shock...severe vibration...

Monile unaffected by dropping milk cans—lactic acids since 1956.

resist destructive acids, alkalies and salts...

No floor erosion despite severe wear since 1957. Inspectors praise Monile.

resist damage from soaking of oil, grease and water.

Monile gives you time-assured performance...is like new after years of service—under conditions destructive to industrial floors. Monile is applied directly over old or new floors—concrete...wood...brick ...tile. See Sweets Plant Engineering File $\frac{5f}{MAS}$ or write for 8-page brochure. **The Master Mechanics Co., Cleveland 28, Ohio or** The Master Mechanics Chemicals Co., (Canada) Ltd., Toronto 14, Ontario.

THE MASTER MECHANICS COMPANY

temperature is said to be easily maintained.

During a five-day test, average temperature of frozen foods leaving warehouse was 12F., and average lading temperature at last delivery was 9F. This performance reportedly is better than can be obtained with conventional methods.

System is relatively inexpensive and easy to install. Cooling is more evenly distributed and pull-down time is shorter. Moreover, the resulting lower humidity keeps packages drier and easier to handle.

However, cost of nitrogen is a problem. Dry ice costs about 4c. per lb. and liquid carbon dioxide 4-5c. Liquid nitrogen costs 2-8c. on a sliding scale that varies with quantity purchased. — *Agricultural Marketing Service, USDA.*

Rubbing Strip Provides Two-Way Protection

Bolting a used tire tread around a fork truck as shown keeps it from getting scratched as truck passes through flapper doors.

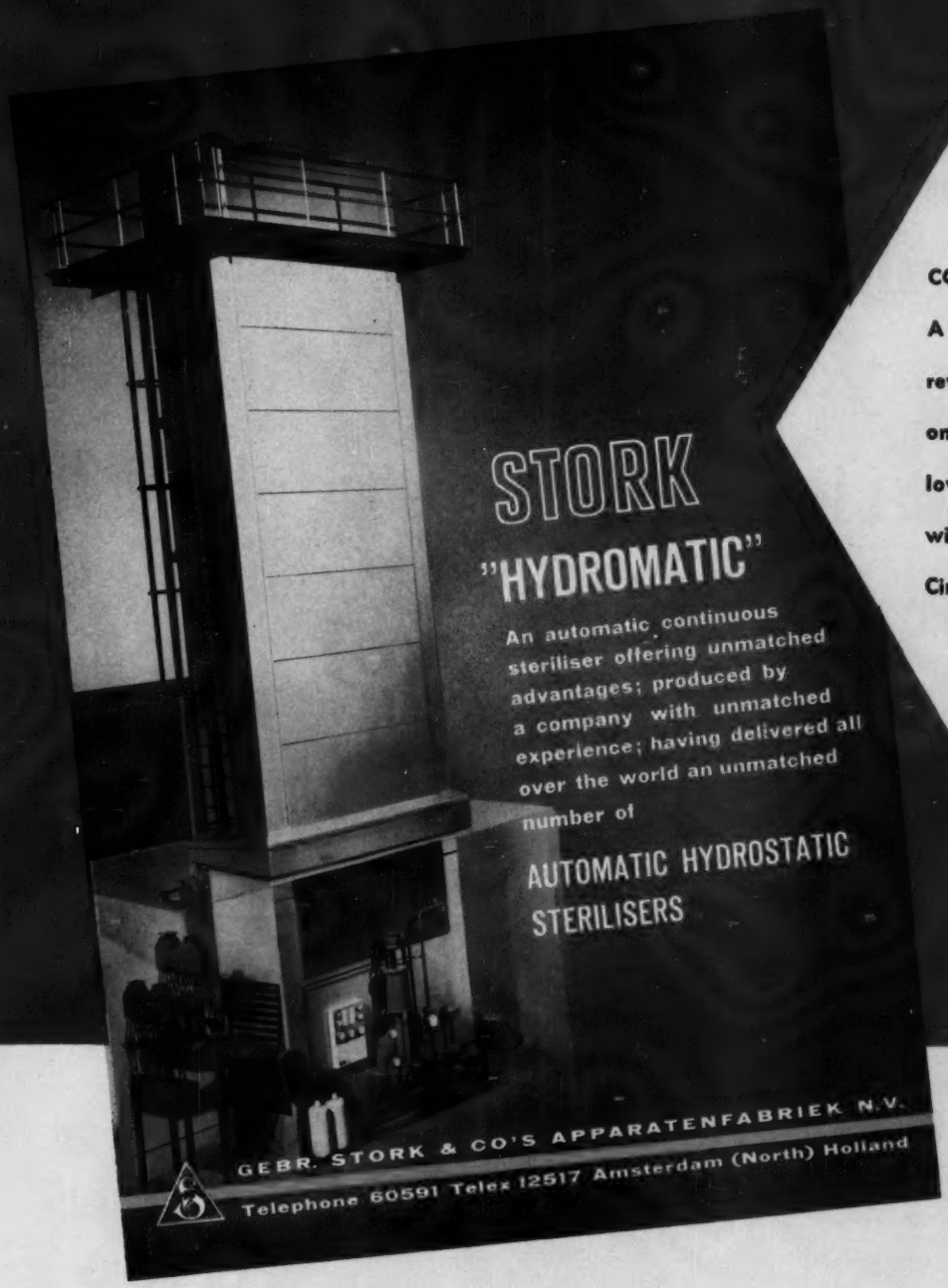
At same time, rubbing strip protects door entrances and anything else truck may hit or rub against. — *A. R. Carstensen, President, Crystal Ice & Cold Storage Warehouse, Sacramento.*

Roofing Gun Cuts Costs

Savings up to 20% in roofing costs are reported for a triple-nozzle gun.

Simultaneously, unit applies two coats of a basic roofing material, such as asphalt, plus a strengthening stream of glass fibers for a firm, even layer. Three men can surface 15,000-18,000 sq. ft. in 8 hr., compared with 8,000 sq. ft. by five men using conventional methods. Moreover, the lighter-weight seamless roof offers economics in structural framing.

Unit is made by *Flintkote Co., Rutherford, N. J.*


STORK
"HYDROMATIC"
An automatic continuous steriliser offering unmatched advantages; produced by a company with unmatched experience; having delivered all over the world an unmatched number of
AUTOMATIC HYDROSTATIC STERILISERS
GEBR. STORK & CO'S APPARATENFABRIEK N.V.
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COST SAVING PROCESS

A 12-page brochure revealing all facts on this automatic low-cost process will glady be sent.

Circle 1 on Inquiry Card

8,360,000

containers per day is the present total capacity of trouble-free Stork Hydromatic Sterilizers throughout the world, installed during the last

15 YEARS

True, Stork of Amsterdam is leading in the field of sterilization. Having delivered over 200 hydrostatic sterilizers all over the world Stork has the know-how to exactly serve your needs.

Whether you use round, square or irregularly shaped cans, lithographed or labelled, one Stork Sterilizer may handle your entire production, or at least very nearly so. Special sterilizers effect automatic rotary sterilization the "safe and efficient hydrostatic way"

Due to weatherproof construction, Stork Sterilizers require a building no more than 10 ft. high. Floor surface required: about 80 sq. ft. Then, of course, enormous savings on steam (70%), and water (80%) may also cure peak-load problems on steam raising and water disposal. We will appreciate opportunity to send you the facts.

STORK

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Circle 1 on Inquiry Card

add
nutrition-flavor
sales appeal
to your product with
Lake States®
or Bakon® (hickory-smoked)
Torula Yeast

Which will spark more sales of your product... *flavor or nutrition?* Lake States offers you a choice of two ingredients: nutritional Dried Torula Yeast and flavorful hickory-smoked Bakon Yeast. At economical cost, Lake States can help you boost your share of the market with a *new* or *improved* product.

LOW COST NUTRITION WITH TORULA YEAST

If your product already possesses a desirable taste, you can increase sales at low cost by adding Lake States Torula Yeast as a nutritional ingredient. Many food and drug manufacturers already use Torula either as an ingredient or as a base to attain a higher nutritional level in their products. Some examples: baby foods, institutional foods, seasoning blends, pharmaceuticals.

Your product can reap the sales value of important nutritional factors with Lake States Torula Yeast. Torula is high in protein (50% minimum), a rich source of lysine and all the amino acids of meat; Torula is a reliable source of the entire vitamin B complex, also containing essential minerals such as calcium, iron, phosphorus and iodine.

Food technologists appreciate the fact that Lake States Torula Yeast is produced from sterile media under vigorous and constant quality control. Thus, Torula is noted for its purity, uniformity, stability and long shelf life. Torula blends well with most products and is bland in flavor.

EXCEPTIONAL FLAVOR WITH BAKON YEAST

Perhaps the strongest sales appeal of your product is taste. If you would like to enhance your product's flavor, or if your product needs a new taste, consider the genuine hickory-smoked flavor of Bakon Yeast. A number of leading food processors have found hickory-smoked Bakon Yeast an ideal flavoring ingredient (and high in nutrition, too) for their products. Examples: baby foods, cheeses, spreads, nibbling foods, crackers, stews and vegetables, soups, spice mixes and seasoning blends. Taste tests have disclosed Bakon Yeast to be superior to even a natural bacon flavor.

DUAL VALUE OF BAKON YEAST IN MARKETING A PRODUCT

Bakon Yeast is 100% hickory-smoked Dried Torula Yeast and as such contains all the nutritional values of Torula. This presents your product with a *double value* which your marketing experts can put to optimum advantage: flavor plus.

Bakon Yeast, Inc., the original producer of smoked yeast, has joined Lake States, America's pioneer and leading producer of Torula Yeast. With expanded production facilities at Rhinelander, Wisconsin, Bakon customers are assured prompt delivery from fresh stock. Nutrition from one low cost ingredient... Bakon Yeast. If yours is a specialty product, consider the fact that Bakon Yeast is salt-free and contains no starch, sugar, meat or meat extract; Bakon meets requirements for low sodium diets. Furthermore, Bakon Yeast is stable, uniform, and conforms to all FDA regulations.

YOUR BEST PROOF

The most convincing facts on the advantages of incorporating either Torula Yeast or Bakon Yeast in your product is the aggregate of food and drug firms which are now marketing Bakon-flavored or Torula-enriched products. But make your own test. Send for complimentary test samples (specifying Lake States Torula or Bakon Yeast) to Lake States, Dept. F-3

TORULA
gives your product vital nutrition to increase sales.

BAKON
gives your product an exciting bacon-like taste plus nutrition for greater sales appeal.

Lake States

LAKE STATES YEAST AND CHEMICAL DIVISION OF ST. REGIS PAPER COMPANY
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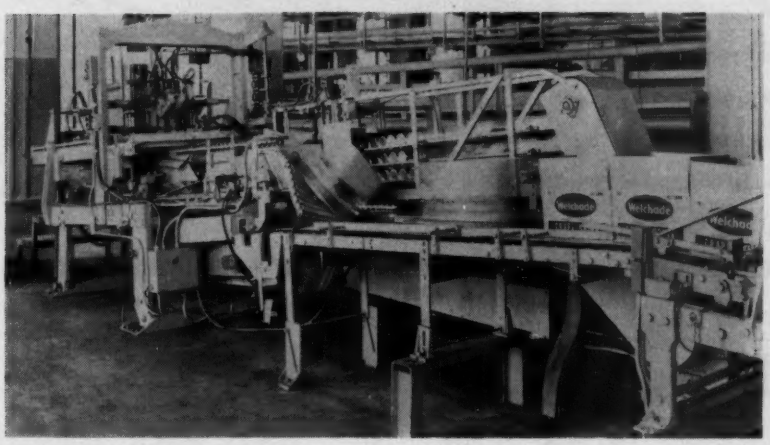
SALES OFFICE: 420 Lexington Ave., New York 17, N.Y.; or W. Glenn Wunderly Company, 232 North Lake Avenue, Pasadena, California; Kempsell Associates, P. O. Box 27, Garland (Dallas), Texas; Dillons Chemical Company, Ltd., Montreal and Toronto, Canada

Doing It Better



HIGH-SPEED UNIT (left) sets up cases, positions them for can packing, then delivers them right-side up for sealing.

WELCH GRAPE JUICE CO.

Automates Case Packing, Doubles Production

Switching from manual to automatic packing of its 32-oz. canned Welchade has upped packaging speed 33% — and overall productivity 100%—at Welch Grape Juice Co., North East, Pa.

Key to the speedup is an automatic unit consisting of a can packer and case-opener-former-positioner. It has enabled receiving empty cans in bulk rather than in the usual reshipping cartons. Moreover, production can be further increased without equipment change, since the can packer can handle up to 450 cans/min. and the case opener will keep pace.

In operation, pallet loads of cans —1,156/pallet—are fed to an automatic empty-can depalletizer. Latter removes one layer of cans at a time and sends them, single file, via an automatic elevator to filling and packaging operations on floor above.

Filled cans enter can packer in a single line and are assembled into required 4x3x1 pack arrangement.

Loading into shipping cases is controlled through a trip switch on the can-packer funnel. When switch is activated by a case automatically positioned over the funnel, pushers load cans 12 at a time into case.

After casing, the case opener rights the carton which is transported via an endless belt to a sealer and compression unit.

Equipment is made by Crompton & Knowles Packaging Corp., Holyoke, Mass. (291)

GREAT WESTERN SUGAR

Combines Filter Aids

A special filter-precoat medium plays a key quality-control role in liquid-sugar production at Great Western Sugar Co., Johnstown, Colo.

Combining asbestos fiber and diatomite filter powder, product insures that syrup meets rigid specifications for turbidity, conductance, color, and bacterial count. Production has increased because syrup clarity is more quickly obtained.

The precoat medium also offers savings in labor and maintenance because filter cake is more easily parted from screens, and filter septums are better protected — thus plug less frequently. Moreover, product permits precoating at higher than usual rates, and its asbestos fiber removes undesirable dissolved solids and colloidally-dispersed matter.

In syrup making, GW uses distilled water to dissolve the sugar. Filter aid is added to the dissolving tank and recirculated through a Niagara filter until latter is coated and effluent is clear. Filtered syrup then goes directly to tank trucks or storage.

Precoat medium is supplied by Johns-Manville Corp., N. Y. C. (292)

DOLE CORP.

Curbs Machine Downtime

ADJUSTABLE-SPEED DRIVE gears pineapple feed to hand-trimming rate.

Pineapple production at Dole Corp., Honolulu, has been upped by an adjustable-speed drive installed on its Ginaca processing machine. Latter automatically reduces some 6,000 pineapples/hr. into separate parts of core, shell, pulp, and a cylinder of fruit.

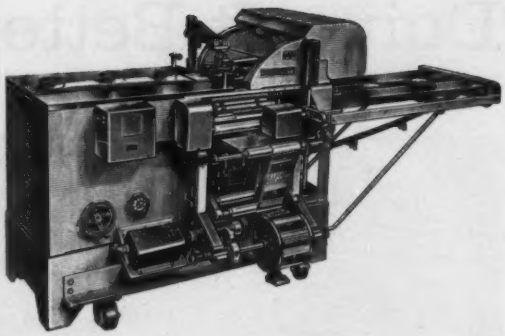
However, workers positioned along conveyorized trimming tables must trim off imperfections before cylinders of pineapple are sliced and placed in cans. By providing speed that can be matched to variable operating conditions, the drive reduces supervisory attention and eliminates idle time on the trimming line.

Unit allows operator to select a higher speed following machine shutdown for adjustments. When conveyors are again filled, speed is reduced to normal. Speed range is 195-780 rpm.

Drive is produced by General Electric Co., Schenectady, N.Y. (293)

MODEL H-1 HOODING MACHINE

This efficient high speed hooding machine is being used in production at speeds in excess of sixty containers per minute. The straight line motion of this machine insures smooth foil container handling and uniform line flow.



EKCO-ALCOA PACKAGING EQUIPMENT is market sized

Whether the size of your market requires high speed automatic packaging equipment or low-cost manual equipment, you can get just the machine you need from Ekco-Alcoa. The H-1 Hooding Machine, for example, is a completely automatic machine engineered specifically for hooding printed light gauge aluminum foil sheet, in register on foil containers. This machine performs equally well with rectangular or round containers. Change over from one size to another is quick and easy. The H-1's simple design makes it easy to maintain and operate.

The Model II, by contrast, is manually operated, illustrating the diversity of Ekco-Alcoa packaging equipment. The operator simply places the filled container with nested cover in the base of the closure die. The foot pedal is depressed and the completed package is automatically positioned for easy removal.

For specification sheets on the H-1, Model II, or other models in our equipment line, write to our Packaging Equipment Division at the address shown below.

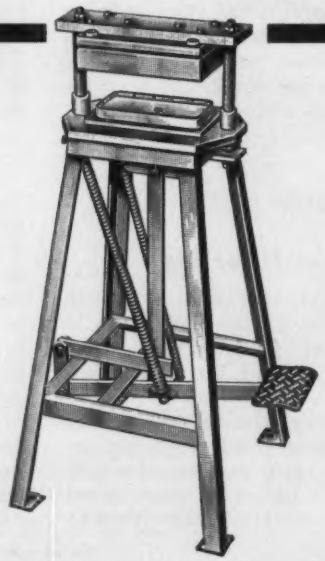
The Plus Container

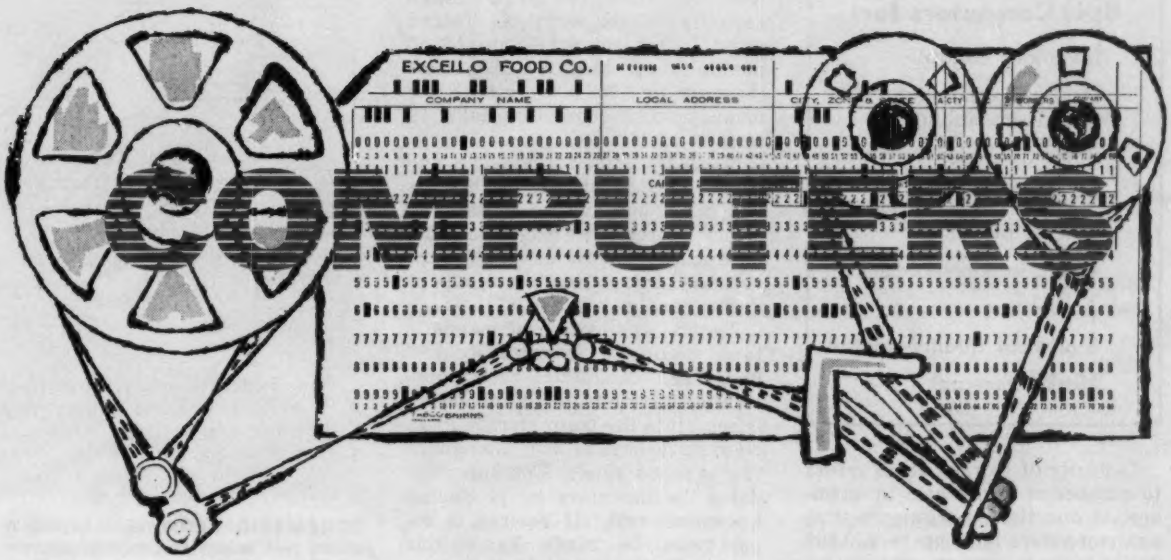
EKCO-ALCOA CONTAINERS INC.
GENERAL OFFICES: WHEELING, ILLINOIS

EKCO is the registered trademark of Ekco Products Company; ALCOA is the registered trademark of Aluminum Company of America. The corporate name and combination mark, EKCO-ALCOA, is used under license to the manufacturer by each of these companies.

MODEL II

This low cost unit is ideal for market testing to determine consumer acceptance and packaging performance. The Model II is also suited for small retail operations and producers using a variety of package sizes.





COMPUTERS —For More Efficient Management

Whatever the function — production and inventory control, accounting, sales analysis, engineering, or maintenance — electronic data processing can handle it quickly and economically

WILL AN ELECTRONIC COMPUTER really pay off for you?

Here are just some of the production and management jobs whose costs are cut when computers take over:

. . . Keeping inventories of raw materials and finished products at economical levels.

. . . Lowering spare-parts inventory and improving maintenance of equipment.

. . . Making more accurate sales analyses that quickly pin-point trouble spots in a product or sales region.

. . . Computing minimum cost ingredient formulas that meet quality standards, legal restrictions, and process requirements.

. . . Assuring accurate, automatic control and recording in batching of ingredients.

. . . Scheduling production for minimum labor and equipment costs, while providing reliable order delivery to stock.

. . . Providing more accurate and comprehensive evaluations of production equipment performance.

. . . Solving complex process design problems.

Medium to large-size food companies not now using computers may profitably apply them to some, or all, of their major problems. Within five years, the already large list of computer users in the food industry will include 90% of the medium to large-size concerns.

Before considering their specific applications, let's take a brief look at computers themselves.

RICHARD D. KORNBLUM
Operations Research Div., Armour & Co., Chicago

Computer Types

Basically there are two — the digital and analog. We will be more concerned with digital computers because they are the type generally used for inventory control, product formulation, accounting, etc.

Digital computers process data according to a program stored in a memory unit. They may 'read' input data from punched cards, magnetic or paper tape, typewriter, or teletype. Data punches, magnetic tape spots, or electrical pulses are translated into magnetic charges or electrical pulses. In any case, the machine stores and handles information as digits.

Analog computers, on the other hand, operate on a situation analogous to the actual process or problem. The analogy may be voltage, pressure, shaft-position, etc., and the analogous situation can be manipulated to study results of different input situations.

Digital machines are of several types which, for convenience, we will classify according to the method used to store information.

Core-storage memory. Storage area is of the fixed-core type, which uses such components as vacuum tubes, magnetic core devices, or transistors (solid-state). Input and calculated data are fed directly into the core area for storage. A large-scale unit takes about 0.15 millisec. to add two 10-digit numbers and proceed to the next program step.

FOOD INDUSTRY Uses Computers for:

- Inventory control
- Product formulation and scheduling
- Sales analysis
- Maintenance
- Process design
- Operations research
- Accounting
- Statistical quality control
- Market research

Capacity of storage areas refers to number of digits held in 'memory' at one time. Large core-storage computers hold up to 250,000 digits in main storage, while medium-size machines hold 20,000-60,000 digits.

The new transistorized core-storage units require less power, air-conditioning, and approximately one-fourth the space of magnetic or vacuum-tube type core-storage models. Magnetic-tape or disks extend storage capacities (with certain processing speed limitations) of both core-storage and magnetic drum units.

Magnetic-drum storage. Here, a high-speed revolving magnetic drum stores input data and calculated output in the form of magnetic 'bits.'

Despite its relatively slower storage-access time, the medium-sized magnetic drum computer is widely used for production, business, engineering, and scientific calculations. Relative compactness (prior to advent of transistorized equipment) and versatility have been its principal advantages.

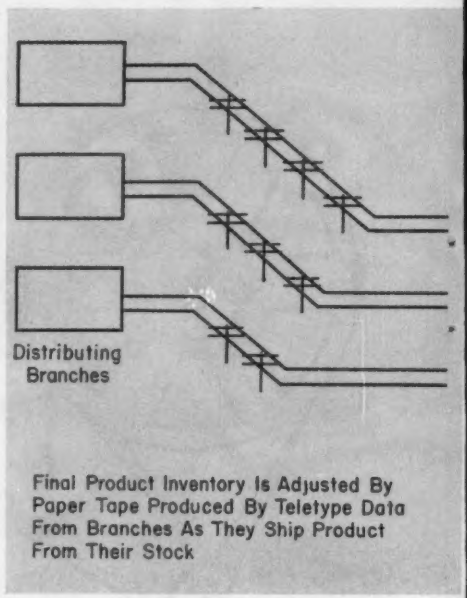
Many types of input-output devices as well as auxiliary storage units may be hooked-up with basic punched-card and paper-tape type magnetic-drum computers.

Magnetic-disk storage. Specially designed for large storage capacity, it is considerably slower in data retrieval and of smaller calculating capacity than core or magnetic-drum machines.

It is well-suited for inventory work because of the large storage capacity of its magnetic record unit. Latter comprises up to 50 double-faced, large records that store up to 6,000,000 digits. Some magnetic-disk computers take up to four such 'files'.

Magnetic tape for storage and 'read-write' functions. Such units are often used as an adjunct to either core- or magnetic-drum type machines. By using the tape reels as storage areas, millions of digits can be handled.

Typical application of magnetic tape would be inventory-control updating. Magnetic reels containing previous day's inventory is read into the main storage area. New stock data is also introduced via punched cards. Computer updates the inventory by producing a current reel. If desired, a report can be made by on-line printers. Or punched cards can be produced containing revised inventory status.



Final Product Inventory Is Adjusted By Paper Tape Produced By Teletype Data From Branches As They Ship Product From Their Stock

SCHEMATIC FLOW of information shows how a digital computer system coordinates product formulation and inventory control.
At point **(1)** Punched cards from the

Computer Programming

Although the computer is an extraordinarily high-speed calculating machine with a fantastic memory, we must still tell it what it is to 'remember'. Instructing the computer on how to solve a problem is called 'programming'.

Thus, the computer must be 'told':

1. Where needed data will be found on card or tape input.
2. What to do with data once it's stored in the 'memory' area.
3. Where finished output is to go on card, tape, and/or printed forms.

Program instructions, which precede feeding data into the machine, are punched into cards or tape. Such instructions are referred to as the 'program deck' if on cards, or 'program tape' if on punched tape.

Programs generally are written by computer specialists, although recent simplifications in technique permit chemists, accountants, and engineers to write programs in computer language.

Generally, a programmer who is employed by the company using a computer is trained by machine's manufacturer. Some industrial programmers work part-time on program writing. Their remaing time is devoted to other data processing jobs, such as methods and systems planning.

Inventory Control

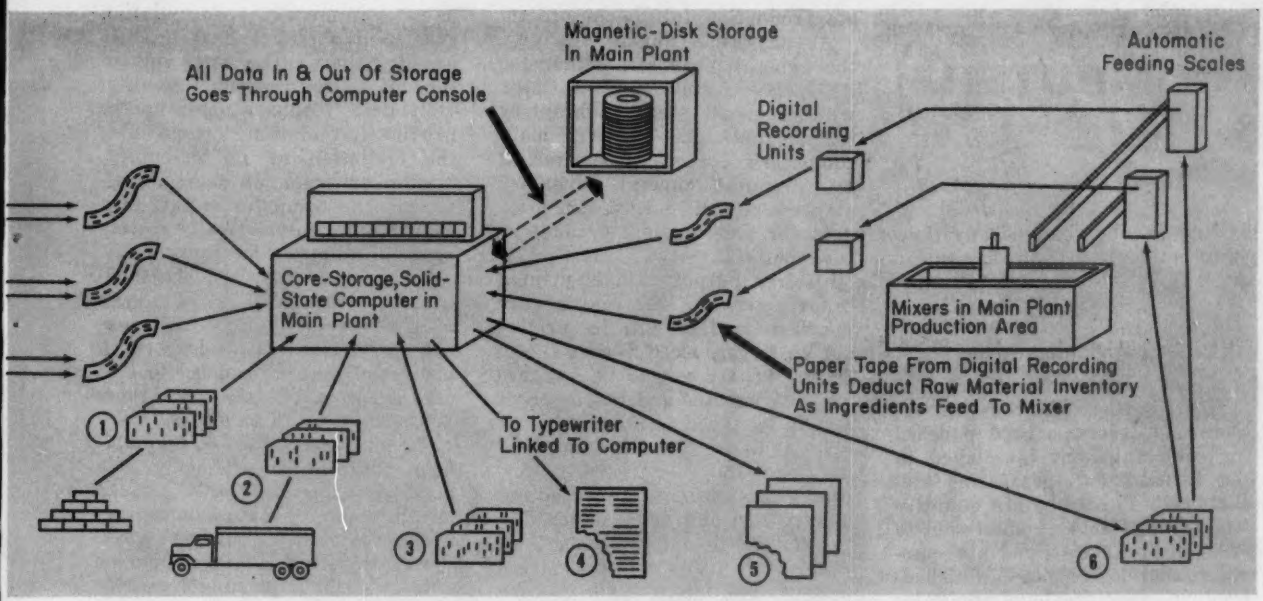
Sizable dollar savings are possible when your inventories of raw materials and finished products are current and accurate. With an efficient inventory control system, you also:

1. Meet production schedules with lower raw materials and finished product inventories. This reduces direct dollar investment in materials as well as fringe costs (warehousing, insurance, ordering, etc.).

2. Reduce order shortage or delayed delivery risks, thereby minimizing chances of customer ill-will and cancellation of an order.

Here's how a computer inventory-control center is used by a food processor with 5,000 employees. Company produces various prepared cookie and cake mixes as well as dehydrated soups and vegetables for the consumer and institutional trade. Facilities include a manufacturing plant and general office plus ten large distribution warehouses throughout a 20-state area.

Management wants to lower its inventory of 500 separate ingredients used in its 100-product line. It also wants to keep a supply of finished items on hand at each warehouse to minimize delivery delays.


All Data In & Out Of Storage Goes Through Computer Console
Magnetic-Disk Storage In Main Plant
Automatic Feeding Scales
Digital Recording Units
Core-Storage, Solid-State Computer in Main Plant
Mixers in Main Plant Production Area
Paper Tape From Digital Recording Units Deduct Raw Material Inventory As Ingredients Feed To Mixer
To Typewriter Linked To Computer
1
2
3
4
5
6

production line update the main-plant inventory as product leaves the line.
(2) Inventory is adjusted as plant ships products to branches.
(3) Purchasing department updates inventory as materials are replenished.
(4) Computer signals purchasing department to re-order materials.
(5) Management receives report of inventory status whenever desired.
(6) Automatic feeding scales are actuated and controlled by product-formulation data on punched cards. Scales feed material-consumption data back to digital recording units.

In joint planning sessions, the problem is detailed for the computer manufacturer by company personnel representing sales, distribution, data processing, operations research, and methods-procedures. In addition, any other jobs for the computer are discussed. Decided at such meetings are equipment to be used and layout for data input-output.

Company's technical personnel, or outside consultants, use current data to determine optimum inventory level. The technique balances minimum costs of warehousing (insurance and handling) and capital inventory investment against cost of shortages or delayed deliveries. Equations enable calculating current optimum inventory levels for specific raw materials, which provide a goal for the computer. This work is done on company's computer.

The computer system is used for inventory control only 50% of the day-shift. At other times, it is used for product formulation, cost control, order analysis, and billing.

Because the computer is not on direct inventory control full time, whereas inventory information is kept on a 'perpetual' basis, a combination of units is used. This permits putting the large amount of data needed for continuing inventory storage on a magnetic-disk storage unit. Calculations for inventory and all other company problems are performed on a fast, medium-sized, solid-state core computer.

Programming for non-inventory and inventory control is arranged so that waiting non-inventory jobs are automatically run into the computer whenever inventory-control work is completed. The magnetic-disk file is used only for inventory data, thus cannot be entered for non-inventory problems.

The system operates in this way:

On Monday morning, the magnetic-disk file holds inventory levels as of the close of the last work day. This includes—

1. Each of the 500 raw materials.

2. The 100 finished items at each of ten distributing warehouses.

3. The same finished items held at the main plant's warehousing facility.

4. Current unit costs for each raw material and prevailing selling prices for each finished item.

As new production consumes raw materials, small digitalized recording instruments attached to feeders monitor the quantity of each entering ingredient.

Digital recorders then punch out paper tapes that are transmitted at intervals to the main, solid-state computer. From here, by programming, tape's data is fed into magnetic-disk file to lower inventory level of each raw material used. Should any ingredient stock level drop to a predetermined re-order point, warning is printed by computer's typewriter.

This order alert goes to the purchasing department, which replaces supplies in time to avoid production shutdown. When replenished raw material goes into stock, a punch card containing quantity and current cost is fed into main computer, which accepts card or paper tape.

The data is then programmed into the magnetic-disk file to update the proper ingredient. If current cost differs from that of earlier supplies, the two lots are kept separate on inventory.

Next step takes place as various finished products are tallied at end of packaging lines. Here production records are punched into cards in central data-processing room, and data are fed into magnetic disks. This, of course, appropriately increases the plant-inventory level of the particular finished products.

Current price data is also stored for each finished item.

Pricing can be changed any time by insertion of proper adjustment cards from sales department.

Distribution Monitored

As outgoing shipments proceed to distributing branches in response to orders, a card punched for each shipment is relayed to the central data-processing department. Cards contain quantity and price of each product sent to ordering branch. Fed into computer, they lower plant's finished-product inventory level and raise its products' inventory levels for branch receiving shipment.

Meanwhile, various distributing branches linked to the main office by direct, leased teletype lines transmit data on products released from stock to customers. Teletype tape is fed directly into main computer and then to magnetic-disk file to reduce respective quantities of product at branch.

Computer prints out a detailed report whenever a finished item's inventory level runs too low at any branch. The level is compared with 'bench marks' fed into system by computed optimum inventory-level calculations. A low stock warning is immediately routed to sales and production personnel who initiate appropriate production fulfillment orders.

At any time during the day, the general office can, either for its own information or at the wired request of a branch, query the magnetic-disk file via main computer's console typewriter. It may request current inventory status and allied cost or price data for any finished product or raw material.

Desired output data is printed by typewriter. Or cards are punched so they can be printed out on larger, more flexible report form. Tape can also be punched by the computer and the inquiry's results teletyped to branches.

In addition to such 'pin-point' inquiries, status of the entire current inventory can be printed out to give cost and price summaries, as well as inventory changes at each branch for sales analysis. Summarized, too, is the total company inventory situation, covering raw materials and finished products.

Product Formulation

Computer control in product formulation affords a rapid means of:

. . . **Selecting lowest-cost combination** of ingredients that yields a product meeting quality and legal specifications.

. . . **Recording amount of each ingredient** used and transmitting the data to a computer inventory-control system.

Dollar savings chalked up by a product-formulation control procedure can be significant. In addition to savings achieved by using minimum-cost formulation consistent with specified product quality, there's the sales advantage of uniform product quality.

By data 'feedback', a computer product-formulation system aids the operation of an inventory-control program. In some installations, the computer is part of a system that automatically meters optimum amounts of ingredients.

Today, computerized finished-product-formulation control is used to varying degrees in a number of food branches—ice cream, processed meats, breads, cookies and crackers, cheeses, and beverages.

We can get an idea of formulation control by reviewing one company's operation. It attacks the problem by using data-processing equipment several ways. First, operations research and/or data-processing personnel modify a program furnished by computer manufacturer to fit specific product-formulation jobs. Input to computer program for each product includes—

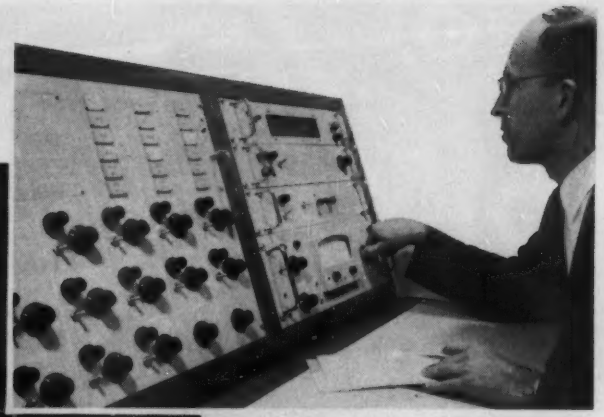
1. Chemical and physical composition of each raw material considered as a possible ingredient.
2. Current cost data for each ingredient.
3. Availability of raw materials as determined by daily inventory control print-outs.
4. Quality specifications for the product, such as moisture, fat, and protein contents.
5. An option—maximum amount of any ingredient that might be used even if not selected as part of the optimum formulation. If a raw material is selected but its amount is restricted in the program, no more than this amount will be used. In that case, the next most desirable ingredients are selected.

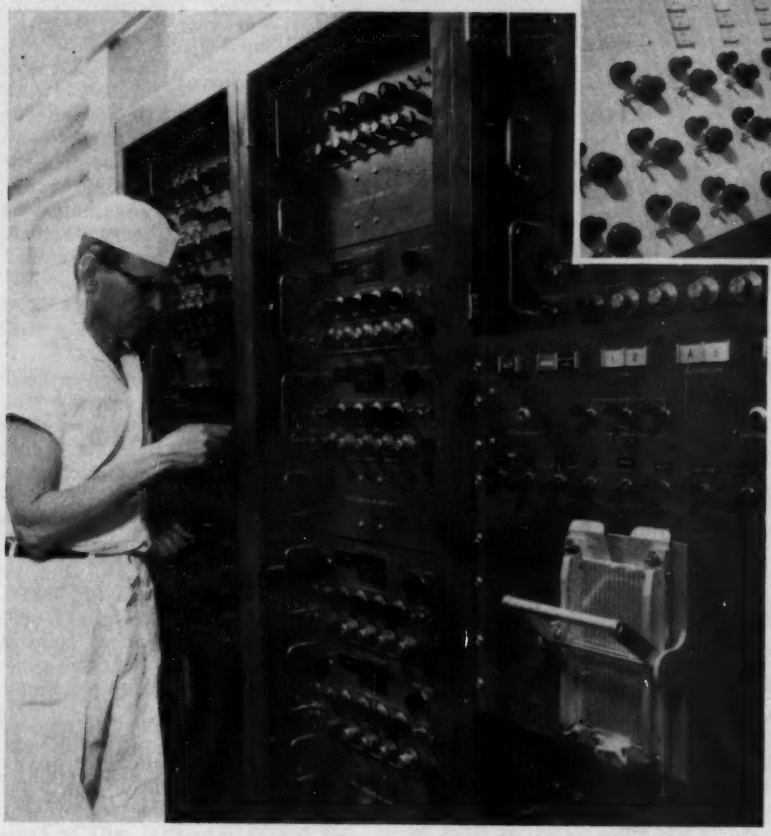
This computer program is run on a solid-state, core computer at 6:00 A.M. every other day. If prices and availability of raw materials do not vary significantly from day to day, optimum-cost calculations need only be run as often as the variables change. We will assume that prices and inventory change significantly every 48 hr. This also assumes that formula and ingredient restrictions remain constant, otherwise new computer runs must be made.

A separate run is made for each product under formulation control. Output is given on cards and in a typewritten report that details minimum current-cost formulation consistent with material

ADVANCED data processing system employs medium-size, solid-state, core-storage computer. Also shown are computer console (1), high-speed printer (2), high-speed card read-punch processing equipment (3), paper-tape reader (4), magnetic character reader for interpreting special printing device's imprints on documents (5), disk-storage unit (6), and magnetic-tape units (7).

COMPACT ANALOG COMPUTER (right) quickly solves complicated formula problems. Operator merely dials in the desired batch quantity and ingredient analysis. Unit then codes the optimum formula on a punch card—ready for inserting into electronic monitor (below). It controls, indicates, and records flow of ingredients from storage to blending tanks as per the formula on the punch card.





availability, product quality, and other restrictions. An optimum-cost calculation, which considers ingredient combinations from as many as 20 different raw materials, can be done in about 5 minutes. By 7:30 A.M., company has current minimum-cost formulas for the 18 major products it will run that day and the next.

Punched cards, prepared by computer for each formulation, indicate the amount of each raw material to be used. At the proper time in the day's production schedule, cards are fed manually into a card reader that activates circuits controlling appropriate feeding scales. These, in turn, meter into mixers the various ingredients that will yield a minimum-cost product.

As scales feed the indicated amounts, small digitalized recorders punch amounts of each ingredient on tape. This data enters the magnetic disk file via main computer programming to reduce available inventory of raw material.

Other Vital Applications

Throughout a food plant there are many other jobs that digital computers handle faster and more accurately than conventional methods. In some instances, a computer system tackles problems presently incapable of solution by non-computerized data processing.

► **Sales analysis.** Either as part of inventory control or as a separate function, a digital computer quickly summarizes reams of sales data and clearly shows sales results by product, sales area, and sales unit by week, month, or year. Management receives these detailed reports while the situation is current, thus effective action can still be taken.

► **Production control.** Tied in with inventory and product-formulation control systems, the computer performs a valuable service in complex, multiple-item production scheduling. It arrives at a minimum-cost schedule by evaluating product, availability of labor and production equipment, unit processing cost, and order requirements. Not only are unit production costs slashed, but stock shortages and gross overages of finished product are practically eliminated.

Such production scheduling does not actually require computer formulation control, but profits greatly from it. Inventory control, however, is a requisite for effective production scheduling.

► **Maintenance.** A computer can greatly simplify efficient control of spare-parts inventory, also replacement and preventive maintenance of equipment. Programs for the latter can be recorded on cards or tape, as can a huge amount of spare-parts data. This assures rapid updating of the total parts inventory, which is thereby held to a minimum.

► **Engineering.** By proper programming, a digital computer speeds the solution of complex process-design problems.

It also gives comprehensive evaluation of new equipment and process performance. One can also gauge the output of older equipment against engineering standards of unit production cost, quality, and maintenance. Process equipment not "carrying its own weight" or gradually falling in production and quality performance can be quickly spotted.

► **Accounting.** Taking card or tape input, a digital computer can process a large amount of "conventional" accounting data.

A weekly payroll for a plant of 5,000 people can be run on a medium-sized computer in 3-4 hr.

THIS medium-size, transistorized digital computer solves highly complex engineering problems. Shown here are core-storage computer console (center), typewriter input-output unit (right), and paper-tape input-output device (left). Other storage and input units (disk, cards, and magnetic tape) can also be connected to computer.

Such a payroll program includes printing paychecks and producing an updated payroll tape (or card file) as the basis for the next week's processing.

Included, too, are individual's federal and state taxes, union and pension deductions, incentive and overtime pay, etc. Total company summaries including tax withholding, as well as union and pension collections, can be programmed.

Other recurring accounting jobs — accounts receivable, cost control, profit-loss statements — are all efficiently handled by such a system.

A job with accounting and sales tie-ins is order processing. This task is performed rapidly by the computer for efficient customer service. It also provides valuable aids to statistical quality control, marketing and economic research, operations research studies, experiment design, and statistical research.

Customer Service

A host of manufacturer's services other than maintenance are generally available to companies purchasing or renting a computer.

Maintenance, however, is handled differently, depending on whether a company rents or buys. We will first discuss the renting procedure, which excludes maintenance considerations.

Services begin long before the signing of a rental contract. Upon initial receipt of a customer inquiry, manufacturer usually conducts a joint preliminary analysis to determine whether there are sufficient existing projects in accounting, sales, engineering, production, and research that could be run profitably on a computer. Further discussions outline possible future jobs for the computer. Detailed plans of present and future work usually are discussed in the later stages of computer pre-planning.

The phrase "profitably run on the computer" may be gaged by such factors as need for reduction in time and clerical personnel in data processing, also the possibility of handling problems not considered capable of solution on present equipment because of their complexity.

In initial planning, it's usually possible to determine the type and size of computer best suited for present and future work. Decision to rent or buy is often worked out with computer manufacturer at this stage.

If need for a computer is established, most manufacturers will offer the following additional services without charge:

1. Detailed discussion of existing projects that will be placed on computer. This step includes planning data-report forms and revising present records for most efficient use by the computer.

2. Detailed planning of future work that can be profitably handled.

3. Physical layout of computer and auxiliary equipment in renting company's plant or office. Such planning often considers air-conditioning needs as well as arrangement of existing data-processing equipment for most efficient tie-in with computer.

In addition, most manufacturers offer (without charge) several types of courses geared to the needs of the renting concern's personnel before computer is installed.

Briefing Courses

For management personnel who will be sending work to the computer or are involved in computer's output, there are ½-3 day "briefing" courses. They explain the computer in general terms and its planned company applications. There is also opportunity for suggestions concerning additional jobs that could be profitably handled by the computer.

Many valuable ideas come from renting company's executive and upper-management personnel in these sessions. In this short course, computer manufacturer's people are often aided by personnel from renting company who have already been trained.

In addition, a 2-4 hr. informative briefing usually is held for lower-echelon office and technical personnel. This is aimed at spiking false rumors as to what the computer may do to relocate personnel and their functions.

In this session, personnel of renting concern and computer manufacturer disclose just what plans are being made for present and future jobs that will be computerized and how such projects will affect company personnel. Point is made (if applicable) that computer will create jobs, after whatever planned re-alignment of personnel is made, by solving problems that formerly could not be handled. Outlined are advantages of faster, better data processing.

Persons who will be working directly with the computer are given more extensive courses. These 2-4 week courses usually are given at the computer manufacturer's local or central education center.

Renting company's personnel trained in these courses include those who will: (1) Operate machine on a regular basis (data processing group); (2) be concerned with problems from entire company (methods and procedures, systems department, operations research group); (3) program problems for their own use (engineering, chemical, and physical research, operations research); and (4) program computer for other

departments (methods and procedures, data processing, operations research).

Courses cover details of computer operations, including logic of machine and thorough training in computer programming for the particular unit. Once a particular computer's programming details are known, it is much easier to learn another machine's programming techniques, even if it is of a larger type.

During this training period, the manufacturer's computer is used for preliminary testing and "debugging" of the renter's programs. Often the renter's personnel do this after their training and before their computer is installed.

'Program Libraries'

Another time-and-money saving aid, furnished without charge by most computer manufacturers before and after machine installation, is the "library program routines." They are a collection of programs, already written for a particular computer. Available as written instruction steps and as cards or tape carrying computer program instructions, they cover problems or parts of problems common to more than one computer user. Programs are written by computer manufacturer's technical personnel or by personnel of industrial and research organizations (including universities) using that particular computer. Thus, they pool computer-technique experience for common types of problems.

Programs may also be obtainable from a number of industrial concerns using a computer of the same make and model. Such user groups make programs available that are not developed by the computer manufacturer.

A library program routine permits computer to process a problem covered in that specific program. The particular data for that problem is put on data cards by the user in a prescribed layout. Thus, renter's computer personnel are spared the time of writing a program for that particular problem. Instead, they can apply the time saved to programming and other details of data processing for their company.

Typical computer library programs available from computer manufacturers include:

...Transportation and distribution.
...Sales analysis and forecasting.
...Production scheduling and allocation.
...Mortgage (amortization).
...Payroll.
...Present worth (capital expenditure.
...Linear programming (problems in optimum blending of raw materials, for example.
...Statistical correlation.
...Statistical analysis for quality control.
...Program assembly and simplified program writing.

What makes computer library programs valuable is that a program developed in one industry may often be applied in another. For example, linear programming for the blending of raw materials was developed originally by the petroleum industry in conjunction with computer manufacturers. It was used to determine minimum cost or maximum return when blending various raw petroleum stocks.

This library program can be used in a seemingly unrelated problem, but one of interest to cookie manufacturers. They are now finding optimum blends of flours, shortenings, etc., that produce lowest-cost cookie formulations. Naturally, such blends adhere to strict quality and legal specifications, also physical limitations for top-efficient processing through mixers, formers, ovens, etc. Such blending programs can be used by other food processors.

Rent or Buy?

In some instances, an organization distinct from the computer manufacturer handles rentals. In most cases, however, the manufacturer rents or sells directly.

Whether to rent or buy is an individual company decision usually determined with the computer manufacturer's aid. Some offer ready-made computer programs that evaluate the pertinent factors in each specific case. Such programs produce comparative quantitative results of renting or buying in dollars and cents.

Rent or buy evaluations often must be done after the preliminary planning stages that tell how much work is to be run on the computer.

Factors to consider in renting a machine include contracted rental charges, use and excise taxes, and possible additional charges for operating the computer overtime. When purchasing a unit, considerations include purchase price, maintenance charges, taxes, and possible obsolescence.

Since rental contracts provide for replacement of current equipment with newer units as they appear, at no cost other than the new rental fee, renting eliminates obsolescence.

Unused Computer Time

Rental of computer time to other

DATA-PROCESSING SYSTEM is centered around medium-size magnetic-drum digital computer. Operator is seated at computer's console. Also spotted are magnetic-disk storage unit (to operator's right), high-speed card read-punch devices (foreground), and magnetic tape cabinets (left). Tape and disk units serve as auxiliaries.

companies is a source of income for firms that have purchased their own computer.

A majority of contracts written to cover rental of computers prohibits renter from sub-letting idle computer time. Thus, we point only to the instance of computer purchasers renting out idle time.

Universities often rent time on their computers to industrial concerns. Some companies and consulting firms, whose purchased computer is not used by the owner's personnel on a 2nd or 3rd shift, also rent unused computer time. This makes the machine available to non-competing industrial firms whose own data processing needs do not justify a full-time electronic computer, or who are not using a computer service center.

Rental fees for part-time computer use usually depend on the particular model and auxiliary units, and take into account the owner's additional maintenance cost.

Maintaining Computers

When renting, equipment maintenance is provided by computer manufacturer as part of the rental contract. Most rental contracts specify, however, that the rental fee covers only a specific number of daily shifts during which the computer will be used. Any regular use of the computer over that specified incurs an extra rental charge, reflecting increased maintenance. Occasional test runs generally are allowed on extra shifts.

If one buys a computer, maintenance is left to the purchaser. However, many computer makers offer a maintenance contract that is often advantageous to the buyer because computer maintenance is complex.

When purchasing a computer, it is usually possible to arrange for a time contract extending 1-5 yr. If such a purchase plan is used, the cost analysis must be altered to include interest on financing.

Costs

A 'small' digital computer may rent for as little as $500 per month. Medium-size computers incur monthly rental charges of $1,500-$6,000, depending on model and auxiliary equipment. The largest computers, including extra tape units, run as high as $40,000 per month.

Outright purchase prices for digital computers are approximately $50,000 for a small unit, $150,000-$250,000 for medium size machines, and $750,000 up for the large ones.

Analog computers assembled from modular units come in sizes (tailor-made to user's needs) that vary from quite small to very large. Correspondingly, analog purchase prices range $1,000-$2,000,000.

Computer Manufacturers

DIGITAL UNITS:

Bendix Computer Div., Bendix Aviation Corp., Los Angeles, Calif.
Daystrom Inc., Weston Instrument Div., Newark, N. J.
Electrodata Div., Burroughs Corp., Chicago
General Dynamics Corp., Rochester, N. Y.
General Electric Co., Schenectady, N. Y.
International Business Machines Corp., N.Y.C., N. Y.
Librascope, Inc., subsidiary of General Precision Equipment Corp., Glendale, Calif.
Litton Industries, Beverly Hills, Calif.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
National Cash Register Co., Electronics Div., Hawthorne, Calif.
Philco Corp., Computer Div., Willow Grove, Penna.
Radio Corp. of America, N. Y. C.
Raytheon Mfg. Co., Waltham, Mass.
Remington Rand (UNIVAC) Div., of Sperry-Rand Corp., N. Y. C.
Royal-McBee Corp., Port Chester, N. Y.
Stewart-Warner Corp., Chicago
Thompson-Ramo-Wooldridge Products, Beverly Hills, Calif.
Westinghouse Electric Corp., Baltimore, Md.

ANALOG UNITS:

Beckman Instruments, Inc., Richmond, Calif.
Donner Scientific Co., Concord, Calif.
General Electric Co., Schenectady, N. Y.
Goodyear Aircraft Corp., Akron, Ohio
Librascope, Inc., subsidiary of General Precision Equipment Corp., Glendale, Calif.
George A. Philbrick Researchers, Inc., Boston, Mass.

Computer Service Center

Often a company's requirements don't justify installation of a computer. Perhaps the firm's present hourly need for computer processing does not exceed 10-20 hr. per week. Or existing data-processing equipment can routinely and profitably handle all but one or two problems, which can be solved by computer once a month or even twice a year.

In either case, facilities of a computer service bureau or service center may be the answer.

There are many types of computer service centers or bureaus. Basically, each consists of an installation of one or more computers, large and/or medium-size models, along with auxiliary equipment. Their operating time may be rented on an hourly, daily, or weekly basis. Many service bureaus also rent time on conventional electronic data-processing equipment — mostly to assist in peak-load work.

Many computer service bureaus are operated by subsidiaries of major computer manufacturers, usually located in larger cities. Some centers are operated by educational institutions.

Service center rental fees vary with size of computer as well as auxiliary equipment. For the medium-sized computer, the fee may be as low as $80 an hour—even lower, if renter agrees to use a definite number of hours each month.

Rental for a large capacity, multi-tape unit may go to $400 per hour. Here, also, a guaranteed minimum hour usage contract can cut rates. Larger units may run the desired work in a much shorter time than would be needed on the medium-sized computer, thus lowering rental cost.

If the industrial firm desires, many service centers also rent the services of programmers and keypunching experts. They prepare the computer program for the problem, if no library program routine is available for the particular job.

They can put the computer output in the report-form desired by the client. However, such services add to the basic computer rental fee. They are usually performed by renter's personnel at his own plant or office.

Contracts for service center rental-time can usually be drawn up for work requiring as little as 1 hr. of machine-time and up to as much time as may be needed. Most contracts in the rental fee provide for personnel from service center to operate computer. However, many centers allow renting firm's people to operate equipment.

A recent development along this do it yourself line of renting computer time, is the creation of regional data centers belonging to a computer manufacturer. At such centers time is rented on very large computers, and equipment is programmed and operated by renter's personnel. (End)

1. Originally a 20 x 40 foot freezer room—12/28/51
2. Enlarged to 20 x 96 feet—10/19/53
3. Moved and enlarged to 50 x 80 feet—4/19/55
4. Enlarged by a 59 x 97 foot addition—12/4/57
5. Enlarged by a 59 x 70 foot addition—1/26/60

How freezer storage space at Sylvan Seal grew—quickly and economically—with Armorply modular construction

from 800 to 14,000 square feet of freezer storage space by rearranging and adding Armorply modules

Easy, fast, low-cost expansion—this is Armorply wall module's big appeal to Sylvan Seal, fast-growing division of the Borden Company.

Sectional walls of Weldwood® Armorply® metal-clad plywood as prefabricated by the Freezer Box Division of Annapolis Yacht Yard, Annapolis, Md., have a patented, joint-locking device which makes for easy joining and eliminates sealing problems. And, Armorply rooms for normal temperature operation (+ 30°F to + 35°F) need no complex foundations or costly masonry—just erect them on a concrete slab. For low-temperature operation, modular floor sections on a concrete slab may be used. An Armorply wall-module room is easy to move—as Sylvan Seal discovered when they moved their 20 x 96 Armorply freezer room (step 3 above).

More usable freezer storage space with Armorply modules. The walls are thinner, the floor space larger than ordinary cinderblock-plus-insulation allows. Yet the superb insulating properties of Armorply wall modules let you maintain constant temperatures as low as −100°F, making it easy to comply with new sub-zero storage standards. **No painting, easy maintenance.** Armorply wall modules come faced with aluminum, stainless steel, or zincbond steel; each is resistant to water, dirt, and vermin.

WELDWOOD ARMORPLY

Modular Refrigerated Structures

—SEND FOR FREE ARMORPLY SAMPLE—

Engineered Products Department
United States Plywood **FE 3-61**
55 West 44th Street, New York 36, N.Y.

☐ Please send me a sample of Armorply and the descriptive booklet #2133 on Armorply cooler and freezer rooms.

☐ Please have a Weldwood representative call with full details.

Name.....

Firm.....

Address.....

City.....**Zone**...**State**.....

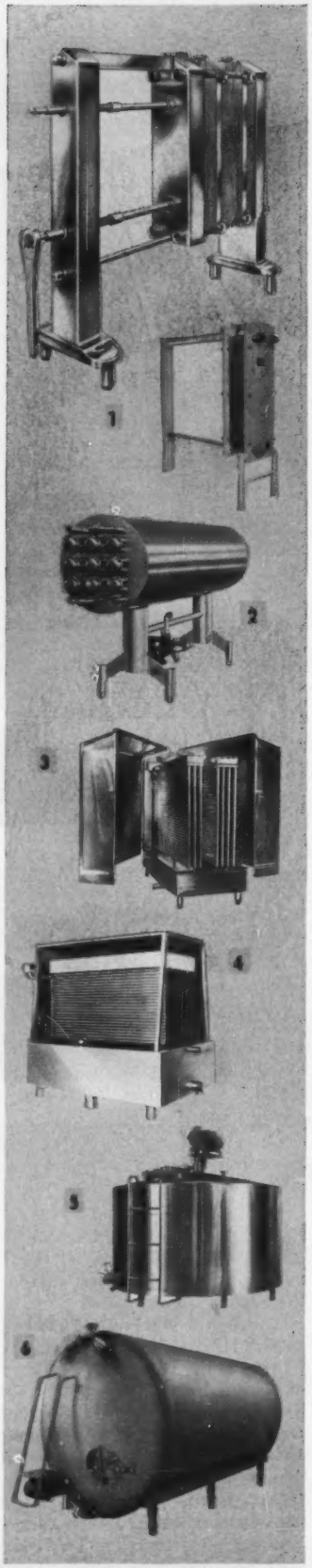
Processing Equipment To Suit the Product

For practically every food or dairy plant service involving the heating, cooling, pasteurization or other processing of a liquid, the Chester-Jensen line includes sanitary stainless steel equipment which has proven its ability to aid materially in maintaining the highest standard of product quality at minimum cost — doing the entire processing job or a major portion of it. Some of this equipment is shown at right:

1. **Plate Heat Exchanger** — 7 types
2. **Ste-Vac (shell-and-tube) Heaters**
3. **Fan ("Beaudelot") Coolers** — 2 types
4. **Chilled Water Units** — 3 types
5. **Processing Vats** — 7 types
6. **Tanks** — Horizontal-Cylindrical and Rectangular

This equipment — actually but a part of the complete Chester-Jensen line — provides means to . . .

- Continuously heat, process and cool pourable homogeneous liquids with the economy of regenerative efficiencies up to 90% . . .
- Heat sensitive liquids to temperatures of 235° or higher without burn-on or damage to product . . .
- Cool viscous liquids to temperatures near their various freezing points . . .
- Supply chilled water for ingredient or circulation purposes . . .
- Batch process or mix liquids of almost any type, including heating, holding, cooling and vacuum treatment if desired . . .
- Store raw or finished product in insulated or uninsulated tanks or under low temperature refrigeration, with or without agitation as required. Pressure tanks for surge, and multi-compartment tanks are also available.



Chester-Jensen Equipment Is Built Entirely In U.S.A.
BUY AMERICAN

These are but a few of the many ways in which Chester-Jensen equipment serves the food, dairy and other industries. Inquiries concerning specific problems are invited.

CHESTER-JENSEN COMPANY
INCORPORATED

Main Office: 5th and Tilghman Sts. **CHESTER, PA.** Branch Factory: Cattaraugus, N. Y.

BUILDERS OF AMERICA'S FIRST SANITARY PLATE HEAT EXCHANGER

Marketing Signals

Chains' rebuttal . . . New convenience market . . . Big side benefits

New Products Spreading Joy

Impressive parade of new food items have benefited others besides food makers. A USDA report on instant potato flakes, developed by the department, points this out in hard cash terms.

Dehydrated spuds have brought growers $6.3 million a year; packaging materials manufacturers, $4.5 million a year. Equipment makers have installed $2.5 million worth of machinery in the 12 plants making the product. And fats and oils suppliers sell flake processors $100,000 of emulsifiers annually. USDA also figures that the product is worth about $2 million a year to labor and management in processing firms.

Integration: Double-Edged Blade

How to stop the chains from integrating backward into manufacturing is a murmur gathering into a groundswell. Some feel that the meat packers' consent decree calls for similar bars against the bigger distributors. It's a moot point that splits food manufacturers.

Chains point out, quietly, that food manufacturers are not adverse to integrating backwards. Thus, Campbell Soup is No. 3 can-maker in the country, General Foods makes its own cartons and sells same to others.

Some food processors have even integrated in the other direction—forward into retailing. As witness Consolidated Foods, Arden Farms, Weston Ltd., Dutch Boy, Golden State, and Quaker Oats (with its franchised setup). **Chances are that more food firms will take up the retailing idea in the future.**

Better Selling: By Big Firms . . .

Decentralized ad planning in Schlitz Brewing's new formula for gearing merchandising closer to local market needs. Four regional ad managers (Atlanta, Chicago, New York, San Francisco), will analyze their markets, then cue Milwaukee-based ad director on what their territories require. New set-up replaces old one where all ad planning was carried out at headquarters, is designed to sharpen brewer's heftier regional outlays.

. . . And Not-So-Big Firms

Hustling Wm. Underwood, with three acquisitions in the last 15 mos., created a new position of field sales manager. Object: Improve relations with 82 brokers who give the company national coverage. New FSM will work through four divisional sales managers who service the brokers. With a broader product line calling for wider distribution, Underwood hopes the stepped-up service will smooth out any growing pains that expansion often brings.

Convenience Foods Factory Style

Items requiring little additional handling or only heating, account for 60% of the money spent for food by factory cafeterias. So estimates USDA on the basis of a survey of factories with 250 or more workers.

Significantly, data showed that since '39 costs of more highly processed foods rose at about the same rate as products with limited processing. In some instances manufactured items cost less than fresh counterparts—e.g., dried eggs, nonfat dried milk.

Also, USDA says, factory food services spend larger share of food dollar for "convenience" items than urban families do.

If Not Jack, Why Not Pepsi

Pepsi-Cola's aggressive merchandising this year will replace the "be sociable" theme with a "think young" slant. Pointing out that the country had just elected its youngest President, Advertising Vice Pres. Philip B. Hinerfield said the new approach is in tune with youth-conscious society.

Pepsi and its bottlers will budget a record $34 million for ad-promotion outlays. Besides a new song, campaign will include re-entry into TV, first time use of national magazines' regional editions, and peak newspaper and radio allocations.

Milkman Becomes Test Marketer

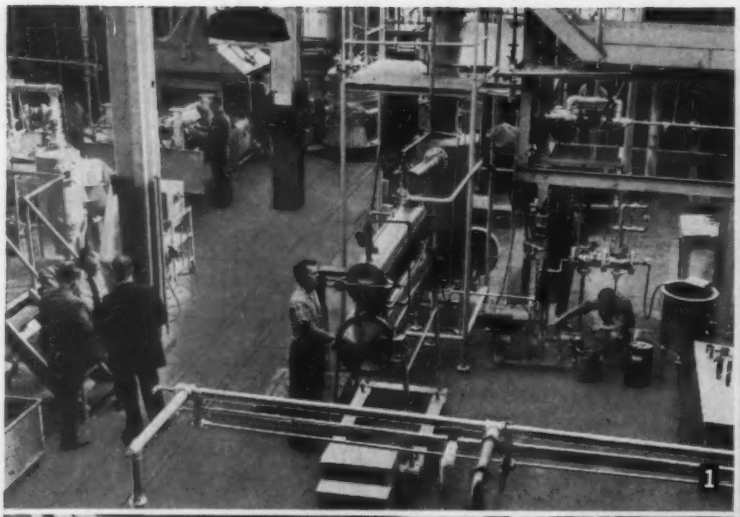
Looking for an economical way to get consumer reaction to a proposed new product? McCormick & Co., hoping to learn whether there is a retail market for its institutional "clamato" juice, hooked up with Foremost Dairies' Philadelphia outlet. House-to-house delivery men distributed product samples to regular customers, along with reprints of ads used when product first appeared in institutional trade 3 yrs. ago, brochure explaining the product, recipe ideas, and questionnaire on which McCormick plans to make evaluation. Because of Pennsylvania's ban against "give-aways," milkmen charged 5¢ for samples (which covered their commission).

BRIEFS

Weekly sales of new super markets opened in '60 dipped 3% below those attained by '59 crop, Super Market Institute reports.

Lenten cheese sales will top $120 million, Kraft Foods estimates.

Key food processors come to Buflovak to develop new and better products at lower cost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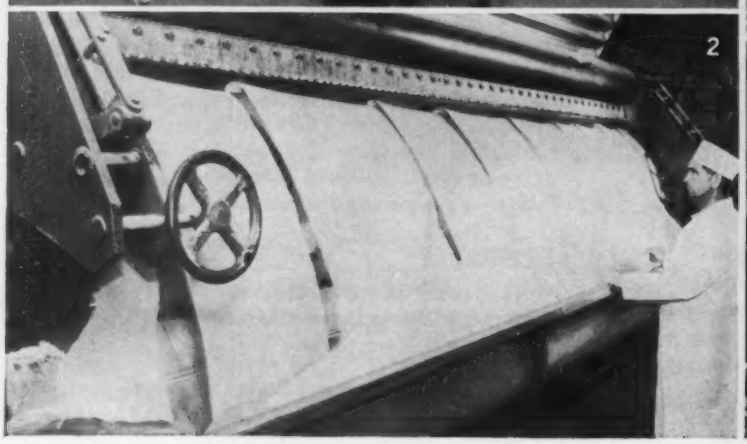
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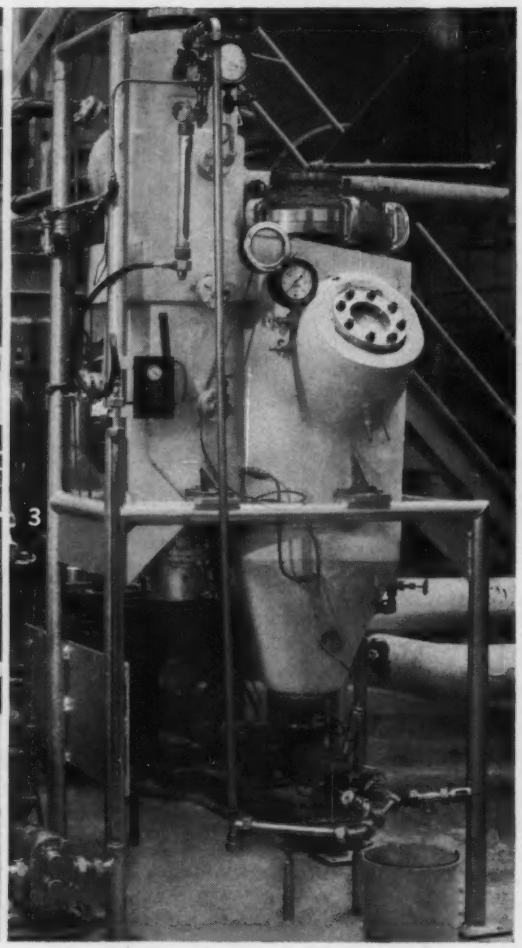

3

More and more of today's progressive food processors explore new products and processes with Buflovak's experienced engineers. **Research** often starts in the Buflovak Customer Technical Service Laboratory—a completely equipped research center for investigating evaporation, drying, solvent recovery, cooling, and other processes. Here you can test by the beakerful or run carload lots on a round-the-clock production scale. **Engineering** experts work with test results or your known specifications . . . impartially select the right units from Buflovak's complete line of food processing equipment. Whenever custom units are preferable, they use their design know-how and production facilities to follow through. **Service** from Buflovak includes realistic deliveries and continuing customer service to keep your operation humming, your profits climbing. Write for Catalog 392 or see our insert in Chemical Engineering Catalog. Buflovak Equipment Division, 1559 Fillmore Avenue, Buffalo 11, New York.

Buflovak Equipment Division

BLAW-KNOX

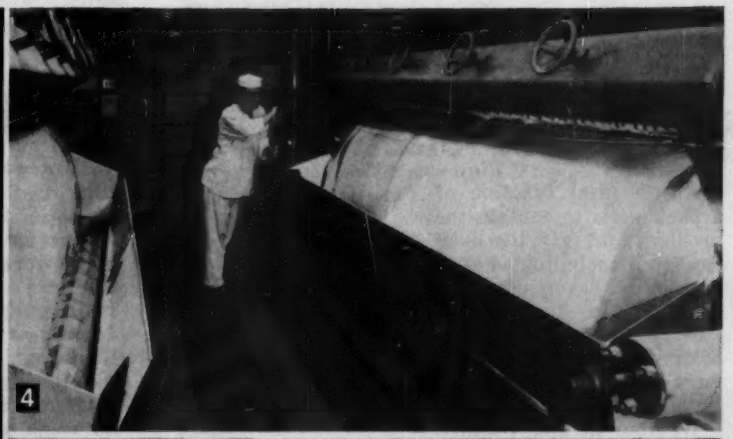
1 **Customer Technical Service Laboratory** is a completely equipped research center where you can test new products, examine process efficiency, and explore by-product possibilities for extra profits.

2 **Potato flakes** are economically produced on this 5-ft. by 16-ft. dryer designed and built by Buflovak.

3 **New Agitated Film Roto-Vak** provides high heat transfer and a processing time of only seconds . . . now permits concentration of viscous, foamy, salting and extremely heat-sensitive products never before successfully concentrated.

4 **Flaked cereals** are mass produced on four double drum dryers operating three shifts a day for a six-day week.

5 **Tomato paste production** was increased 100% with the installation of a Buflovak triple effect evaporator.



5 Key Areas To Check—

To get the most out of a container switch, be sure that new package does what the product calls for. . . . Here are 5 basics which will help you decide whether "this package change is necessary"

PLASTICS are getting more attention from food firms as the "wonder solution" to packaging problems created by the flood of new products. Also, recent innovations have spurred interest in plastics for new packaging for older product lines.

BUT, unless you want to be mouse-trapped by the change-for-sake-of-change thinking, here are five key points you should keep in mind when you are considering a package change.

1. Product Protection

An essential function of a package is to contain the product and all its components, including water, grease, oil, flavor, odor, etc. Furthermore, the product must be safeguarded from dust, dirt, water, oxygen, and other environmental elements.

Whether in film, coating, or rigid container forms, a given plastic will be more permeable to some things; less to others. Because permeability is a function of thickness, shelf life is often extended simply by increasing thickness.

As barrier requirements become more exacting, combinations such as polyethylene/cellophane or poly/foil may be required. One type of instant mashed potatoes, for example, requires paper/poly/foil/poly for moisture and oxygen protection.

A few years ago, plastics seemed totally inadequate for such difficult-to-protect items as mustard, ketchup, and coffee. Today, single-service mustard and ketchup pouches are popular in institutional markets where shelf life is controlled. Mustard pouch is a poly/cello construction; the ketchup sack, glassine/foil/poly. Instant coffee is now following this trend.

DAVID D. JAMES
Industry Specialist-Packaging, E. I. duPont de Nemours & Co.

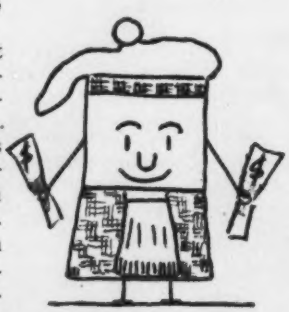
2. Mechanical Protection

A package must not only guard a product against mechanical damage, but it must also protect itself from damage to its own functional properties. It must retain its barrier properties despite impact and abrasion. Likewise, it must resist puncturing and tearing.

Rigidity is often another prime requisite of a package. Although some plastic materials offer sufficient rigidity for bottles and molded containers, it is often more economical to combine plastic with, for example, paperboard to gain rigidity at lower-cost. Plastic supplies the needed barrier; paperboard the form stability.

Turning to the pouch package again for an example, dehydrated food packagers often learned the hard way that a high percentage of failures could occur during shipping due to poor heat seals or rupture of a foil barrier at a corner of the pouch. Heat seals were improved in some cases by use of a thicker polyethylene heat-seal coating; in other cases, by mechanical adjustments to the make-and-fill machine. The foil fracture problem was overcome partly by the improved seals.

3. Economics



Over-all package cost must be kept to a minimum, consistent with merchandising considerations. To be sure, in these days of self-service merchandising, the package often acts as the salesman. Consequently, premium packaging costs can be justified on the basis of increased product saleability.

On the other hand, the food industry's very competitive nature will not tolerate the over-designed and over-priced package for long.

Before Changing Your Package

A heat-sealed, poly-coated carton recently replaced a waxed box for packaging frozen ocean perch. This package has superior appearance, durability, and release qualities, but its success is based equally on costs. The new packaging system has proved less expensive than the old.

The savings are not due to the packaging materials themselves but come from economies in floor space and elimination of four out of the seven steps utilized in producing the old package.

4. Packaging Machinery

For a new package to be successful, related machinery must be adaptable for economic high-speed, semi-automatic or automatic operation. "Over-all cost" must include machinery costs.

For, in the final analysis, the economics relating to the creation of a completely new package or to the revision of an existing one must take into account packaging line costs including set-up, filling, cartoning, etc.

Recent history of poly bread wraps is a case in point. Several years ago, bakeries were offered an exciting new wrap. Not only was it transparent, soft to the touch, and highly-protective, but it was also very inexpensive.

Why has the progress of poly bread wraps been so slow? Because of packaging machinery.

Originally, low-cost modifications to the film-feeding and heat-sealing sections of mechanical bread wrappers were considered to be the machinery answer. Wrapping rates, however, proved to be very disappointing.

In addition, variation in film thickness caused many rejects. To be sure, thicker film tended to solve the latter problem, but at the same time it bridged an economic incentive poly was supposed to have.

Today, major bread wrap machinery makers offer equipment which will handle all bread wrap materials, including poly, at equal rates. Film quality has been improved, and poly is again a bright star in the bread wrap field.

5. Merchandising

The successful package, easy and pleasant to use, functions as a silent salesman in the store and as a sales reminder in the home. **Often, its functional properties increase the value of the product it contains.** Therefore, merchandising requirements must be carefully considered.

A few leakers, a frustrating closure, or any other ill-conceived feature will destroy repeat sales of even the most attractive package.

The amount of shelf space the container requires, the way it lends itself to display stacking, and the "face" it turns toward the store aisle are other marketing factors that require thorough investigation.

In meeting these merchandising needs, plastics packaging has proved itself at the market place. Poly produce bags have gained almost universal acceptance for clarity, toughness, and pleasant feel.

Multi-ply pouches are serving admirably, not just as technically-sound packages, but for portion control, ease of opening, and the heat-and-serve function, in many cases. The new poly-coated milk cartons have already endeared themselves to the housewife by eliminating annoying wax flake-off.

A smart food marketer will count five before making changes in his packaging. He'll carefully consider each of the five principles described above —product protection, mechanical protection, economics, packaging machinery, and merchandising— before reaching his decision.

True, there are many problems involved in pioneering a new package. The successful package pioneer, however, receives his reward in a competitive edge at the market place. (End)

Notice how the thin film keeps the water vapor trapped?

It is also a good oxygen barrier. And it is good to eat.

Visualize a translucent edible film cast directly on a food—skin-tight. No further wrap is needed to keep the food fresh, moist, and at correct weight. The coating itself is bland, stable against oxidation, wholesome, nutritious.

There are many other possibilities your product development department might see in *Myvacet® Distilled Acetylated Monoglycerides*. These non-greasy materials, made from edible fats, are well suited as slab oils, equipment lubricants, emulsifiers, food container components, and plasticizers for other coatings. They are approved for use, up to 5%, in or on finished food.*

To take a closer look at these interesting materials, send for samples of *Myvacet Distilled Acetylated Monoglycerides* and for bulletins detailing specific uses with poultry, frozen and processed meats, frozen fish, dried fruits, nuts and candies, and storage eggs. Write ***Distillation Products Industries,*** Rochester 3, N. Y. Sales offices: New York and Chicago • W. M. Gillies, Inc., West Coast • Charles Albert Smith Limited, Montreal and Toronto.

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CURTAIN WALL at building foundation prevents ingress.

Knowing mouse habits and contamination hazards is a prerequisite in rodent control. Rodent-proofing and basics come first

Mice Are Underrated in Food Plants

PART I— Habits and Hazards

WHEN RODENTS are considered as a pest around food processing plants, somehow rats always come to mind rather than mice, probably because the former are physically a larger menace and therefore more obnoxious. Conversely, however, mice generally far outnumber rats in food plants and are the more frequent source of contamination.

One pair of House Mice can have about 60 young in a year. They are quite prolific when you recognize that their resulting great-great grandchildren also will bear young that same year.

In a year, a pair of mice in a food plant will consume about 8 pounds of the plant's food products and deposit about 18,000 excreta fece droppings. Obviously some of this filth creates a severe hazard of contamination.

The U. S. Public Health Service has stated that it may take as many as twenty individual rodents living in a fair sized food plant before they are so numerous that they are ordinarily seen by those working in the plant. This is obviously a generality but serves to make the point: **Do not expect to see living rodents unless you have a lot of them.**

T. L. HUGE'
President, The Huge' Co., Inc., St. Louis

Look for Evidence

Only the evidences they leave behind will be seen and these can be noted by detailed, intensive periodic inspections of the plant. When their excreta pellets are found in anywhere from ten to thirty places, this is a strong indication that the infestation in your plant is moderate or rated somewhere between 20-50 mice. If many holes are gnawed through floors and walls to structural harborages in the building, and if tracks can be easily located, the estimation is that the population is large, probably over 50.

The habits of rats inside a building differ from those of mice. Thus different control methods are required. Rats have a much wider range than do mice. Once inside, rats tend to roam throughout the entire structure whereas mice will stay very close to their food supply, sometimes never venturing beyond a 20 x 20 ft. area.

Because mice are stay-at-homes, it is very important to learn what areas inside the building mice are frequenting. The most obvious way is by their excreta droppings, easily distinguishable from rats' droppings which are three times larger. Excreta droppings are blackish, soft and somewhat shiny when fresh but become hard and dull later. Undisturbed droppings remain intact for long periods. Therefore, their existence in places frequently swept or cleaned gives evidence of recent activity, and also the mouse population in the area.

Other forms of evidence are nesting material, urine stains, gnawings, smudge marks (where their bodies have rubbed along

CEMENT BUTTRESS at wall-floor juncture inhibits storage against walls.

HARDWARE CLOTH is effective in rodent-proofing. It can be used to block holes or openings in walls as at left, or to screen off roof ventilators shown above. (Left photo USDA.)

surfaces), and even their characteristic musty odor.

Another way of ascertaining whether rodents are in a suspected area is to lay down squares of lightly dusted talcum powder or some similar substance (avoid flour which can be infected by insects). Then observe periodically to see if any footprints and tailmarks appear. Also, a bait can be checked this way for its palatability and acceptance by observing if any rodents are coming near it.

Regulatory inspectors, as well as our own sanitation consultants, when encountering stains on bagfood materials, use an ultra-violet lamp to see if this material fluoresces the typical rodent urine stain color. In this case, a sample of the food product is collected from underneath the stain inside the bag and analyzed for chemical proof of urine presence —which is cause for regulatory action.

Basics Come First

Before any extermination begins, there are certain basic principles of rodent control that come first. First, it is necessary to eliminate or reduce the attractants that bring them in or near the plant. Secondly, it is imperative that the building be considered as a fortress and properly rodent-proofed so as to "build out" rats and mice.

Conversely, if there is ample harborage and food scraps to attract rodents and if the building is wide open and not rodent-proofed, actual killing or trapping techniques on the inside are going to be a never-ending job and only partly adequate at best.

Rodents will come into buildings seeking warmth, shelter, food, and breeding sites particularly in the fall. Old lumber, scrap machinery, high weeds, etc., remaining just outside the building will serve as an excellent stopping-off place for the rodents' traffic to the interior of the plant. Obviously, these should be eliminated. If such items are not around the building, rodents have a much more difficult time entering since then they have no choice but to dash across open spaces which they do not like to do.

Mice almost literally enter a plant "on the backs of men." This means that they will hide or nest in and around bagged material entering the plant, on skids, etc. But the vast majority enter through poorly protected barriers such as ill-fitting doors, breaks around pipe lead-ins, windows that are not snug, etc.

Steps for Rodent-Proofing

All that rodent-proofing requires is for an individual to walk around the outside premises, find holes or openings through which a forefinger can be inserted, and to block these openings. Where exterior mouse-proofing is done, common building materials suffice —whereas for rat-proofing, special durable materials and techniques must be employed.

Doors, either sliding or otherwise, are the worst offenders and where they meet it is well to flash them with metal to prevent later entry through rodent gnawings. Frequently, rats will gnaw into a building and provide an opening for others. Sliding doors should be blocked behind and fitted so that they are snug. Hardware cloth is a good rodent-proofing material over windows. "Curtain-walls" prevent burrowing underneath the foundation and are more applicable to rats. With mice it is more important to have every square inch of the outside plant snugly rodent-proof up to several feet above the ground rather than worry too much about several feet under the ground.

Trash disposal areas outside the plant must be policed since untidy and unsanitary conditions can attract rodents. Trash, and especially garbage cans, should be kept tightly covered and, if possible, above the ground in a specially provided structure. It is well to provide lids with chains so that they do not become lost or misplaced. Haul-away trash containers which have covers are an excellent means for plant trash disposal.

Entrances into the plant should be examined critically. Doors should have self-closing devices. Frequently doorways exposed to heavy traffic are kept open constantly. And yet observation will reveal that they probably could be kept closed most of the time. Many times we find that doors are bigger than they should be to accommodate normal traffic. These can be reduced in size.

Where rodent burrows are encountered, rodent-proofing is required plus control methods in the burrows usually through calcium cyanide gas dusting. If a plant is located alongside a stream or river, the bank can be examined for burrows.

How Mice Infest

To substantiate the extent of mice infestation, we recently examined a large number of case histories of Federal Food & Drug prosecutions against food plants because of unsanitary conditions. In these cases over 90% pertained to pest evidence of some kind, usually involving insects, rodents, and birds. In those cases where rodents were a factor, 80% involved mice rather than rats.

Rodents do not, as many people

think, contaminate a food product merely by contacting it directly. One prime source of filth contamination is the numerous feces they deposit in the premises. If these are not removed immediately through good housekeeping, they become dry, hard and eventually crumble.

Rodent hairs, embedded in pellets as a result of frequent rodent licking and ingestion, are liberated. These hairs, then can become airborne and deposit themselves directly on a food product or on a food processing surface. Similarly when rodents are trapped or killed and their carcasses are not removed immediately, the hair from their bodies can enter the produce stream. Rodent hairs are readily identified under a microscope by a color structure sometimes referred to as "railroad track" because bars of color are intermittent with colorless bars, and are definitely distinguishable from all other types of hairs.

Rodents can be carriers of diseases such as murine types of fever, infectious jaundice, rat-bite fever, trichinosis, poliomyelitis, and rabies. Examination of many thousands of mouse pellets disclosed 30 to 40% of them contaminated with Salmonella food poisoning organisms.

Rodents constitute another menace in that they have been known to start fires by: Carrying matches to their hiding places; by causing short circuits through gnawing electrical wires; and, by accumulating nesting materials composed of highly inflammable material such as oily rags and other substances of a combustible nature.

Some food plants become so infested by rodents that they have to be exposed to a general fumigation wherein the entire building is sealed up and then gassed. This becomes necessary only in an extremely bad situation. Here immediate cleanup must also be effected since rodents can re-invade the same building and set up housekeeping again a week after fumigation.

Constant continuing control is the important point rather than quick curative methods. And after basic preliminary steps are taken with adequate rodent-proofing, baiting and trapping techniques can be used for extermination. These methods will be discussed in the next issue of Food Engineering. (End)

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You can save time when planning and save money when buying if you'll send for these DAY dust control bulletins. Each contains valuable information about dust control equipment and systems. Here's general information plus useful technical data and specifications. Ask for any bulletins which interest you — they're free. Check coupon below and mail toDAY.

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"SCHLITZ DEFEATS DUST" — FOOD ENGINEERING magazine reprint describes all out dust control for 3½ million bushel Schlitz grain elevator. Request Bulletin "Schlitz" Defeats Dust."

"EFFICIENT DUST SNATCHERS" — Bulletin describes DAY's part in providing maximum safety and good housekeeping for starch packing building of large food processor.

BULLETIN 510—DAY Unit Dust Collectors. Complete, low cost unit designed for plants or applications where central dust control systems are not practical.

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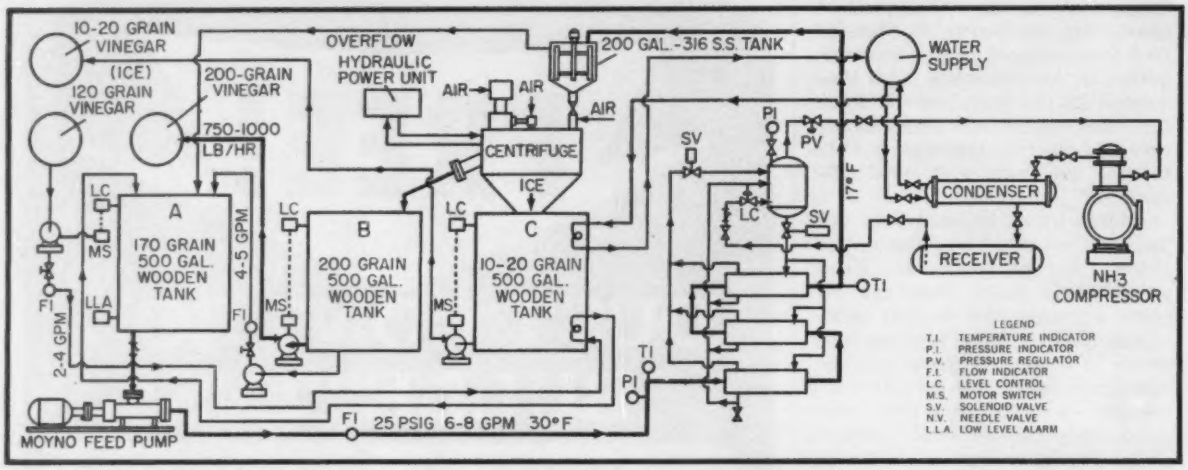
CIRCLE 81 ON INQUIRY CARD



IN FREEZE-CONCENTRATING system, an intermediate-strength vinegar blend is metered continuously through a heat exchanger, and product is slush-frozen to about 17F. Ice is separated by centrifuging to produce concentrate.

Continuous Process Freeze-Concentrates Vinegar

Continuous slush-freezing of vinegar and centrifuging out the ice produces concentrate. Production of 200-gr. vinegar achieves rate of 1,000 lb./hr.

NEED FOR CONCENTRATED VINEGAR — especially by pickle packers—has induced a Midwest vinegar firm to install a new continuous vinegar-concentrating line.

Developed by Girdler Process Equipment Div., Chemetron Corp., Louisville, the process produces a 200-gr. concentrate from 120-gr. vinegar at a rate of 750-1,000 lb./-hr. Higher concentrates can be produced at reduced rates, as for example: 300-gr. at 600 lb./hr. and 400-gr. at 400 lb./hr.

The basic principle of the process is slush-freezing vinegar of intermediate strength and then contrifuging the ice from the slush to produce the concentrate.

Why do pickle packers want concentrated vinegar? Chiefly economics.

Examples: Pickle packers using vinegar to prepare brine for steeping cucumbers periodically introduce additional vinegar to maintain acid strength. It's necessary because cucumber's water dilutes the brine, which becomes ineffective. Moreover, the brine is discarded along with a loss of such solids as sugar and salt as well as flavoring material.

By using the concentrate (200-gr. vinegar), pickle packers introduce a smaller volume of vinegar into their brines. Not only that, they use such brines for longer periods than heretofore. And they also save on freight and storage.

New continuous process method, first commercially feasible system of its kind, can reduce vinegar concentration costs substantially over conventional batch techniques. It is equally adaptable to processing other similar fluid materials.

How Concentrate Is Made

Here's how production of the 200-gr. concentrate (see above drawing) proceeds:

Operations start off with the preparation of 170-gr. vinegar in a 500-gal. wooden tank (tank A in drawing) by blending 120- and 200-gr. vinegars. Blend is then continuously metered through an ammonia-jacketed, Votator heat-exchanger. Here, product is slush-frozen from 30 to about 17F. Flow through Votator unit is two or three times that of infeed.

Vinegar discharged from heat-exchanger contains 20-25% ice. It's then charged into a stainless steel, agitator-equipped surge tank,

Vinegar Concentrate Can Benefit:

Canners & packers of pickled vegetables

Producers of meat & fish specialties

Packers of various condiments
Manufacturers of salad dressings

FE Staff

intermittently feeding a 200-gal. basket-type centrifuge.

Centrifuge cycle automatically controlled: Loading about 100 gal. of slush into centrifuge in about 2½ min., centrifuging for about 14 min., removing ice with pneumatically-operated plow for about 2 min., and readying centrifuge for next cycle (for subsequent charge).

Liquid effluent (200-gr. concentrate) is discharged from centrifuge and into a 500-gal. storage tank (tank B in drawing) for subsequent tank-truck transport to users. Ice is passed from bottom of centrifuge bowl and into a 500-gal. wooden tank. Since this ice contains vinegar (10 to 20 gr.), it is re-used in the production of other vinegar.

Economies Realized

How savings are effected: By pre-cooling fresh vinegar (120 gr.) with the separated ice, temperature of incoming stream is lowered, thereby reducing the sensible heat load in the Votator heat-exchanger. Since this ice-vinegar interchange doesn't completely melt the ice,refrigeration system's condenser water completes the ice melting. In instances of processor using cooling tower, water cooling tower requirements will be greatly reduced.

Concentrating 300- or 400-gr. vinegars are carried out similarly, blending up from 120-gr. to starting intermediates of higher strength. Main difference is in the size of the heat-exchanger. (End)

"I fed it a recipe for a new cake mix we were contemplating."

Here's part of modern mixing room where LIGHTNIN Mixers blend Worcestershire Sauce.

How they insure uniformity of 130-year-old product

You don't gamble on equipment when you've been producing the famed Worcestershire Sauce since 1830.

That's why, for years, the makers of this product have blended it with LIGHTNIN Mixers. And that's why, when Lea & Perrins Company got ready to move into a new plant at Fair Lawn, N. J., they asked a LIGHTNIN Mixer representative for assistance.

He offered ideas on mixing that helped to improve the process. And he provided, on deadline, mixers that gently but efficiently blend the sauce in eight 6000-gallon aging tanks, two blending tanks, and a hold tank just ahead of the bottling line. Each mixer picks up and suspends solid ingredients in the liquid components, insuring uniformity at every step.

No downtime: "We would recommend LIGHTNIN Mixers to anyone," says W. Wallace Ryan, vice president and production manager for Lea & Perrins.

"Not one hour of our processing has been interrupted because of maintenance trouble or repairs to the mixers."

You, too, can take the gamble out of fluid mixing. Every LIGHTNIN Mixer you buy gives you *guaranteed* mixing results. LIGHTNIN Mixers are built to stand years of continuous heavy-duty service. Thousands are in use, many for 20 years and more.

Sizes from ⅛ to 500 hp, for every size and type of vessel. To get details, call in your LIGHTNIN Mixer representative now, or write us direct for illustrated catalog.

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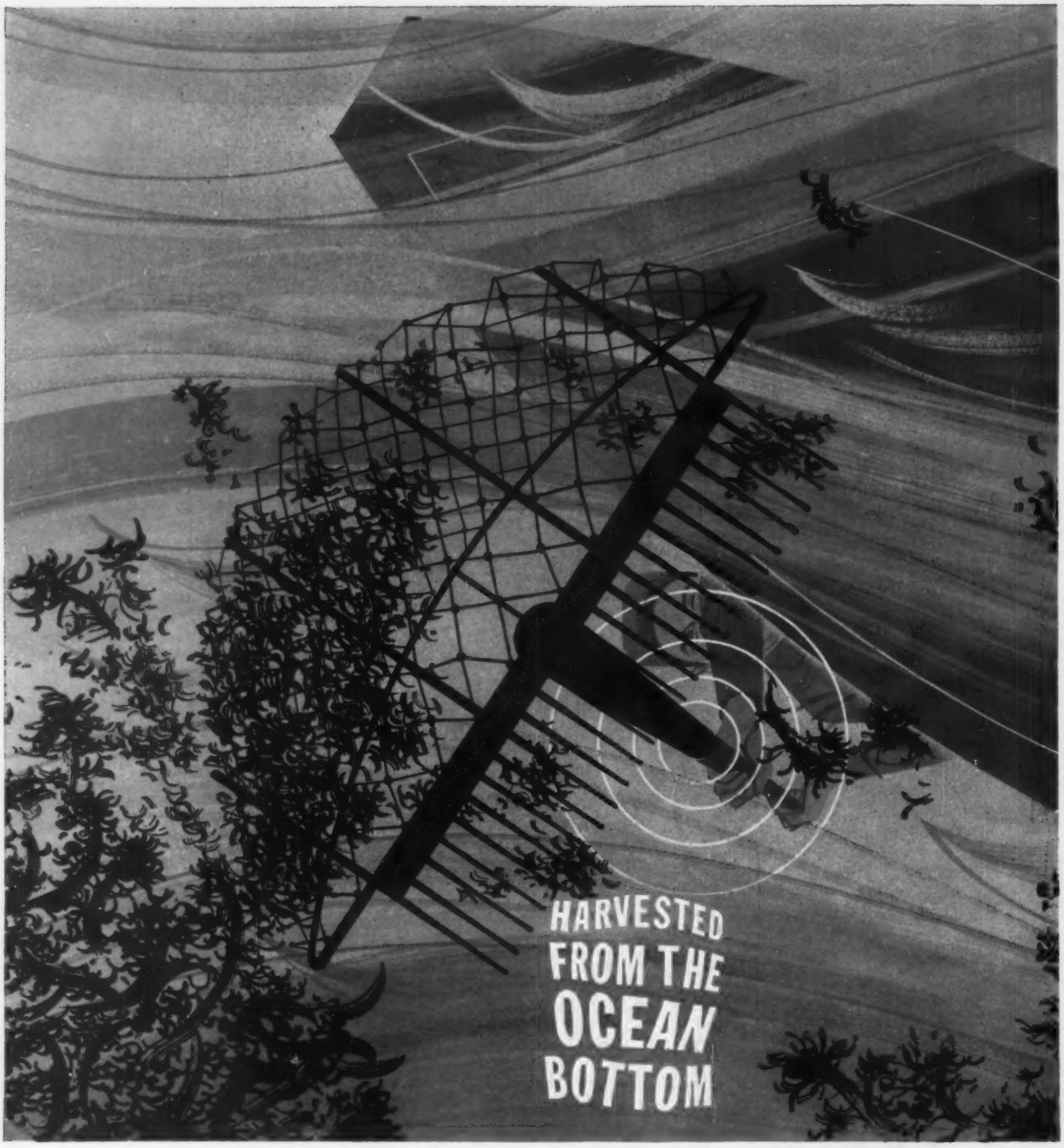
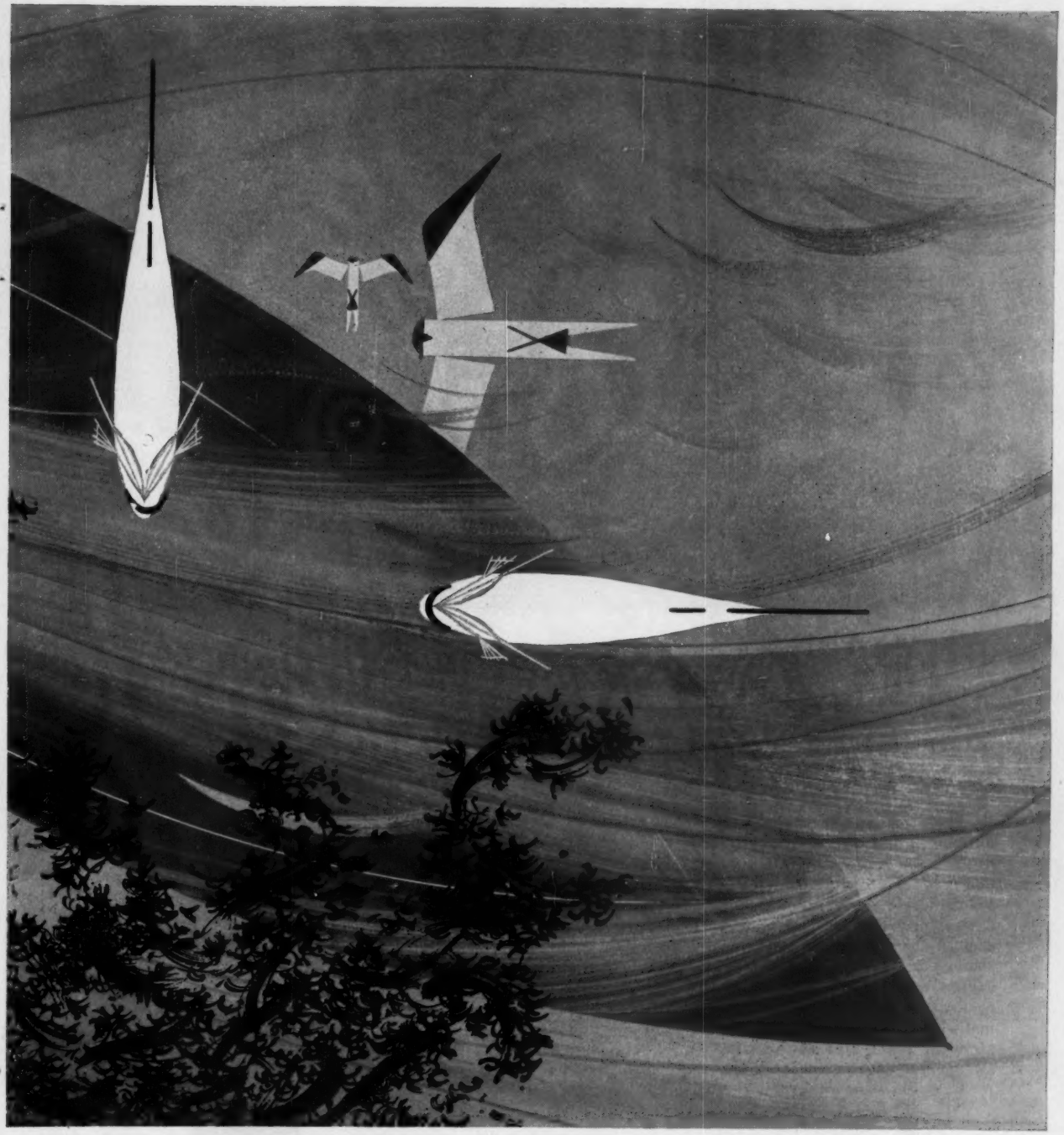
CIRCLE 83 ON INQUIRY CARD



A MIRACULOUS STABILIZER OF INFINITE USES—Beneath the pounding surf off the rugged coasts of Maine and Nova Scotia, grows a plant the fishermen call "Irish moss." For centuries Irish moss was "just another seaweed." Yet today this plant is raked from the cool ocean floor, dried by the sun and specially processed by Kraft under conditions of maximum sanitation, to produce an extremely effective natural stabilizer known as Kraystay. In essence, Kraystay is the edible extract of Irish moss, a natural gum that functions to: Stabilize—Emulsify—Suspend—Thicken—Gel. Every reason why, if the products you make incorporate a stabilizing, emulsifying or thickening agent, you should investigate the economy and consistent performance offered by versatile Kraystay. In new product development, Kraystay can play a vital role, too. And if you use a thickener—



Kraystay's special properties can help you produce a smoother, more consistent product, one with better "mouth feel." Remember, Kraystay is easily dispersed in cold water and goes completely into solution at 165 degrees. The coupon below will get you the complete story of Kraystay from Kraft.

KRAYSTAY vegetable stabilizer by **KRAFT**

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500 Peshtigo Court, Chicago 90, Illinois

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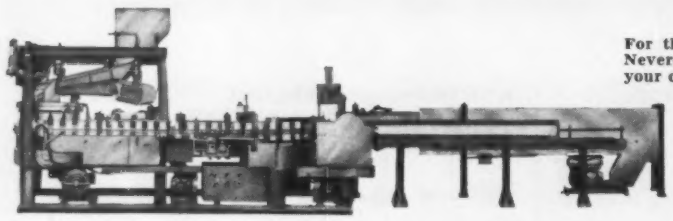
CIRCLE 85 ON INQUIRY CARD

FMC Neverstop provides flexibility and high speed for Beech-Nut products

Beech-Nut Foods packages four different infant cereals on a single high-speed Neverstop, without changeover. Equipped with a Vibrametric feed mechanism, Neverstop accurately packages each of the pre-cooked cereals at 300 or more per minute . . . from carton to finished "baby-size" package in one completely automatic operation. A one-ounce, single-wall, 3-inch-high carton with tab opening pouring spout is used.

Many well-known companies rely on Neverstop for packaging such products as detergents, cereals, rice, cake mixes, etc. • The Neverstop automatically opens cartons from a magazine supply then code dates, bottom seals, fills, top seals and delivers them under the supervision of a single attendant. • Six models offer a wide choice of speeds (up to 400 per minute), capacities (up to 10 lbs.) and carton sizes (up to 11 x 5 x 15½). • Three different types of filling methods—pocket, auger and the exclusive Vibrametric system—are available to handle a broad range of product flow characteristics. New multiple filling head simultaneously fills two or three different products into a partitioned carton. • Optional equipment includes automatic checkweighing of each carton with feedback to volumetric control . . . and Calk-Sealing to eliminate the need for inner bags or overwraps. FMC also offers a complete line of both automatic and semi-automatic auger fillers for medium and short production runs . . . and SIG double package makers for products requiring inner bags or overwraps.



For the full story of FMC Neverstop fillers, write for your copy of Bulletin P-808.

neverstop

Putting Ideas to Work

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Advances in Technology

Chromatography Simplifies Flavor and Odor Analysis

Because of the complexity of flavors and odors, it is extremely difficult to treat them analytically by conventional means.

Recent developments in the technology of capillary, or Golay, columns, and the availability of highly sensitive ionization detectors with wide dynamic range, have simplified such work. The capillary column provides more efficient separation. And the flame ionization detector is well suited to analysis of flavor components present in high concentrations of water or air. This detector has essentially no response to these components.

By combining these two units and optimizing conditions, it is now possible to analyze directly a sample of an odor in the same concentration in which it would reach the nose of an observer.

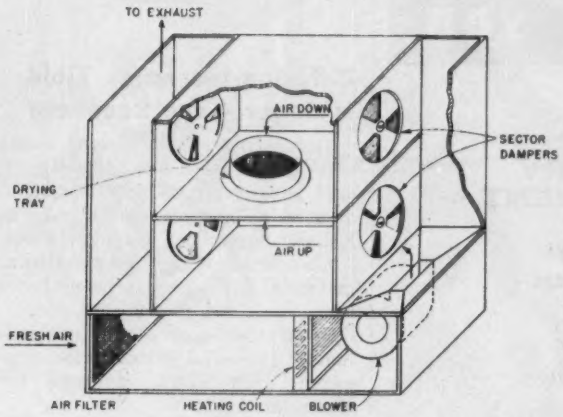
Gas chromatography may therefore supplement a taste panel to maintain the standard of quality set for a product by a panel. Further, it offers the chance for more research which will permit the development of meaningful objective flavor and odor analysis.—*Perkin-Elmer Instrument News*, Vol. 12, No. 1, 1960.

Carbonyl Compounds in Nonfat Dry Milk

Compound identification indicates that lipid oxidation and Maillard-type browning occurred in instant nonfat dry milk (NFDM) stored at room temperature for one yr.

Identified compounds were: Formaldehyde, acetaldehyde, acetone, butanone, methylpropanal, 3-methylbutanal, furfural, diacetyl, hexanal, and nonanal. Presence is also indicated for: Heptanal, octanal, decanal, dodecanal, and tetradecanal.

These isolated compounds are believed to be largely responsible for the cereal-type flavor which sometimes develops in NFDM. It was estimated that the flavorful carbonyl compounds existed in reconstituted NFDM at levels of a few parts per billion.—*Jour. of Dairy Science*, 1744-1750, Dec., 1960.



THROUGH - FLOW DRYER used experimentally. Airflow is adjusted to either upflow or downflow by opening the proper dampers.

Improved Processing Methods Are Developed for Dehydrofreezing Apples

Through-flow drying in dehydrofreezing of apples improves operation by eliminating the need for maintaining a high humidity in the dryer and by increasing drying capacity 3-fold per unit of drying surface.

By adjusting piece size, dip conditions, and holding time, the control of initial SO_2 content of apple wedges prepared for dehydrofreezing is readily attained. However, since only 3 to 10% of the initial SO_2 content remains in dehydrofrozen apple wedges after processing and baking into pie, levels of SO_2 as high as 400 ppm in the fruit (before drying) can be used safely.

Blanching of the double-strength fruit prior to freezing gives two great advantages: Packaging density is increased 25-30%; and, tendency toward formation of dark centers during defrosting of products insufficiently penetrated by SO_2 is eliminated.

Nonsulfured dehydrofrozen apples may be produced from fruit treated with salt and citric acid. But drying temperatures must be lower, and double-strength fruit must be blanched before freezing. *Food Technology*, 32-36, Jan., 1961.

Foreign Fat Detection in Cocoa Butter

Detection of foreign fat additions to cocoa butter or to chocolate has been improved by using the method of low temperature crystallization of the fat extracted from the chocolate and by chemical and physical examination of the acetone-soluble fraction.

Nevertheless there is enough variation in the range of constants of normal and natural cocoa butter to make the detection of foreign fats by comparison of constants alone uncertain. The yield of acetone-soluble fraction, its refractive index, extinction at 425 mmu., iodine value and acid value have proved most useful. These have been determined for: 17 pure cocoa butters of different origins; seven mixtures of 5% non-permitted fat (non-permitted under German law) with 95% cocoa butter; and, for mixtures containing 10 to 12% hazel-nut or almond oil (permitted additive fats).

The constants do not vary at random but exhibit more or less correlation when they are paired for consideration. Thus, when the ten possible pairs of constants are plotted, the acid number vs. refractive index, and the acid number vs. iodine value gave good separation of the pure cocoa butters

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and those with the added fats except for tangawang butter, a fat very similar to cocoa butter.—*International Chocolate Review*, 548-552, (15) No. 12, 1960.

Diffusion Increases Yield in Sugar Cane Recovery

Recovering juice from sugar cane by diffusion has some significant advantages. This was demonstrated by pilot plant production at Kekaha Sugar Co., Kauai, Hawaii.

Compared with conventional methods, diffusion has been shown to:

. . . *Improve recovery* by approximately 4%—97.5% extraction compared with 93.6% average for Hawaiian mills.

. . . *Produce a sirup* with better refining characteristics.

. . . *Decrease capital* costs approximately $100/ton/day.

. . . *Require less* electrical power.

. . . *Reduce* plant maintenance.

Key to the new technique is shredding the cane so that at least 94% of the sugar cells are ruptured. This permits the juice to be readily extracted with a minimum of water.—*Chemical Engineering*, 82-84, Dec. 12, 1960.

Frozen Food Sampling for Bacterial Analysis Studied

Total bacterial counts in 19 lots of 24 samples of chicken pot pies taken between March 31 and January 6 from a commercial processing line showed wide fluctuations but tended to maximum values during the summer months.

Samples taken on Tuesdays and Wednesdays were generally lower in bacterial numbers than those taken on Mondays and on the last days of the week. Sample to sample variations are large.

Analysis of the log counts of 117 groups of pies (3 to 12 samples per group) showed that the variation within groups was less than the variation among groups. Taking only one or two pies at frequent intervals will therefore give more information and a better indication of bacterial quality than would larger samples taken at wider intervals.

It was also found that bacterial counts on one product are not necessarily indicators of the bacterial numbers in other products from the same plant.—*Applied Microbiology*, 382-386, (8) No. 6, 1960.

Lab Heat Exchanger for Texturating Shortenings

A small Votator-type, wiped-surface heat exchanger for chilling and texturating shortening has been developed. It's been used in the laboratory to: Process various types of shortening for research; supply tailored shortenings to prospects for evaluation; and check the operation of plant Votators.

The unit, mounted on a table (2 x 4 ft.) with casters, needs only an electrical outlet. It operates at fat feed-rates of 10 to 80 lbs./hr. and has an integrated ¾-ton Freon refrigeration system capable of holding the chilling to ±1F. in the range −30 to +60F.

Other features are: 4-step pulley agitator drives on both chilling and texturating units give 330 to 1170 rpm speed range; aluminum alloy chilling and texturating units; fat and air Flowrators with needle-valve control; and free-swinging wiper blades.—*Jour. of Amer. Oil Chemists' Society*, 643-646, Dec., 1960.

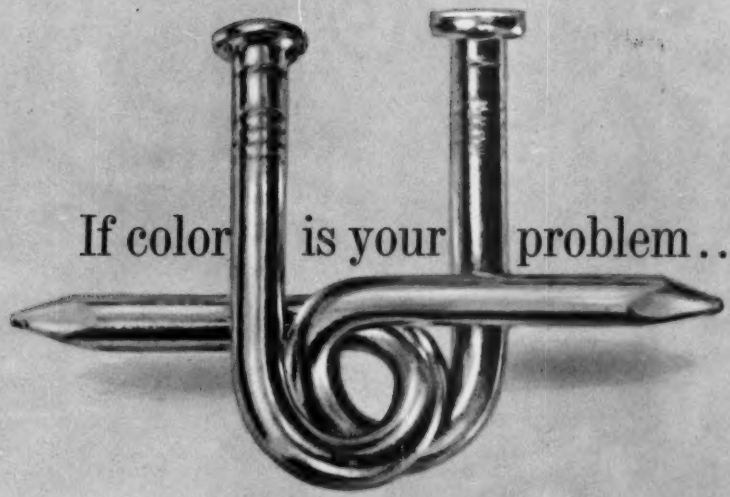
Nutritional, Chemical Changes in Heated Fats

The role of fats and their derivatives in health and nutrition is of great interest to the layman, nutritionists, and chemist. This review summarizes the available literature concerning the effects of various physical treatments on fats. It also points up the need for further applied research and practical information concerning the processing and use of dietary fats.

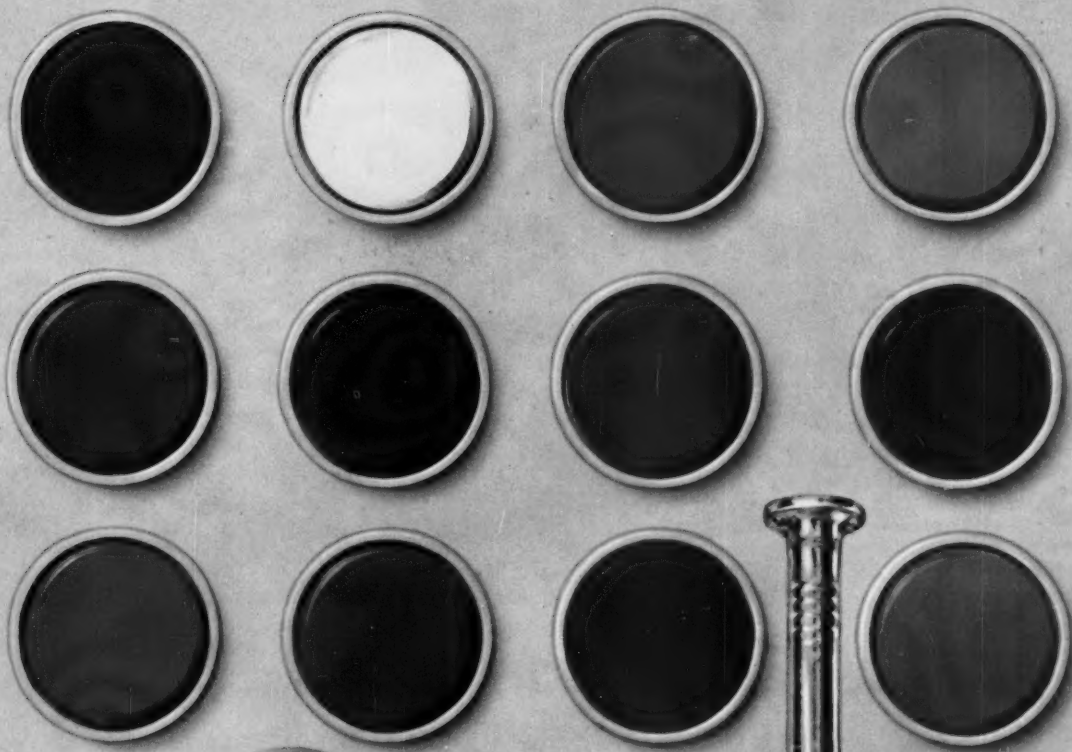
Certain types of such treatments may possibly result in a loss of nutritional value in the fat. Fats altered in this way (and possibly produced in deep fat frying of foods and other processing operations) are organoleptically acceptable in human diet, but have been shown to exert a growth depressing effect when fed to animals.

Most research on heated fats has been concerned with the types of compounds formed during polymerization. This includes: Mode of polymer formation, structure, conditions for optimum polymerization, and the nutritional and physiological effects of polymers.

Three types of generally recognized degradative changes are discussed: 1) autoxidation, 2) thermal polymerization, and 3) thermal oxidation. 111 literature references are cited.—*Food Technology*, 508-514, Oct., 1960.



If color is your problem...



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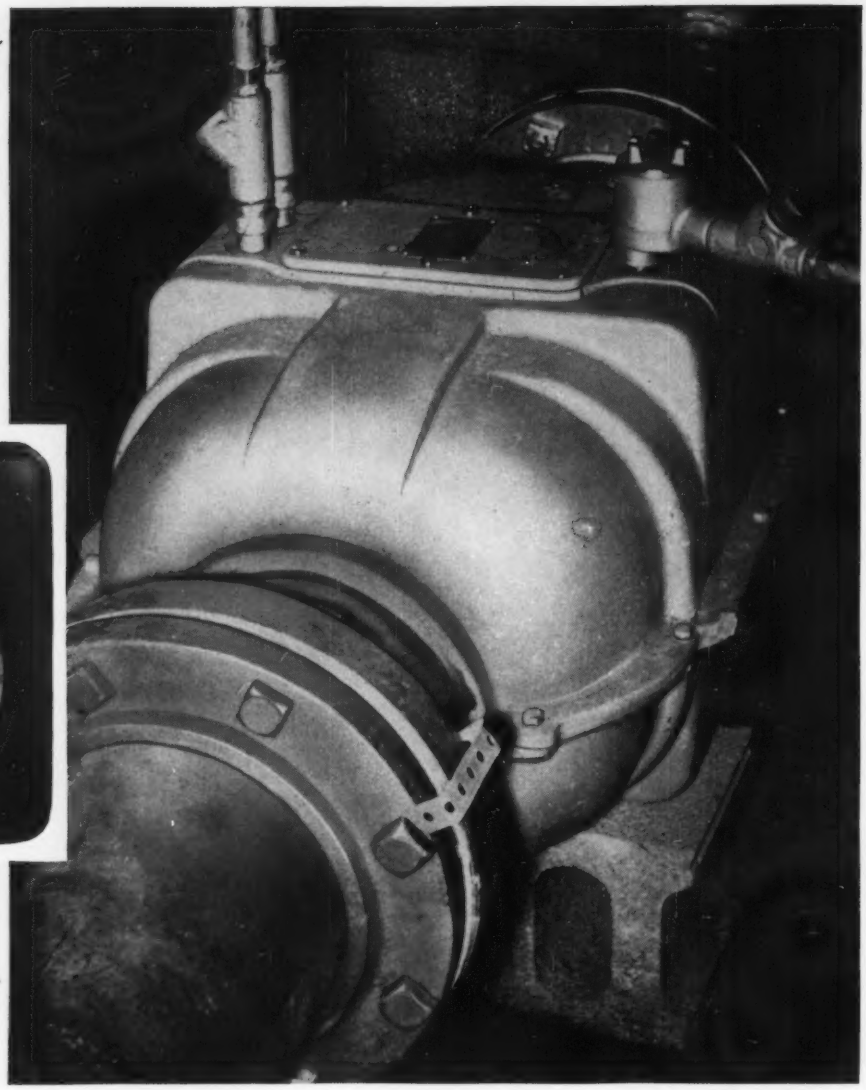

8" Foxboro Magnetic Meter ▶ measures flow of effluent into town sewage system — sends linear signal to recording instrument by electric cable.

Foxboro Magnetic Flow Meter reduces sewer tax for Pennsylvania cannery

Sewage billed on meter readings instead of water consumption

D. E. Winebrenner and Company, Hanover, Pa. had a problem. The Town of Hanover was assessing them a Sewage Tax based on the Cannery's water meter reading. In canning season, however, as much as 25% of the plant's water consumption went into the cans of peas and corn which they process.

Solution: installation of a Foxboro 8" Magnetic Flow Meter in the sewage line carrying effluent from the canning process. The town now bills on Dynalog* recorder readings, and Winebrenner pockets the savings.

The Foxboro Magnetic Flow Meter can help you cut processing costs in many other ways. Since it has no flow restrictions of any type, juices, starch slurries — even liquids as thick as molasses — can be metered accurately, continuously. There's nothing to foul or plug up. Linear measurement is made by electrodes flush-mounted in meter wall — signal carried by electric cable to a Dynalog receiver-recorder. Meter and receiver seldom — if ever — require maintenance.

Ask your Foxboro Field Engineer to show you how the Magnetic Flow Meter can save you money and increase the efficiency of your plant. Or write for Bulletin 20-14. The Foxboro Company, 303 Neponset Avenue, Foxboro, Massachusetts.

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KANSAS CITY'S Packing House District (center) and Warehouse District (beyond) were devastated by flooding of Kansas River in summer of '51.

How To Fight Floods

Protective measures can save you thousands of dollars in property damage caused by this annual hazard

FLOOD DAMAGE to products, plants, and equipment runs into millions of dollars annually, not to mention incalculable losses of actual production time. Your plant can minimize this danger by preparing now to prevent potential disaster.

Faced with an exceptionally severe winter, much of the country may be in for additional flooding this year. First thing to do is check your local weather bureau for information on past floods to estimate the possible danger to your plant.

Then be guided by these FE checklists. One tells you what steps to take when a flood threatens. The other indicates what to do if damage does occur.

When Flood Threatens

► Building . . .

Make overall check of doors, windows, toilets, cracks in basement walls, entrance openings for pipes and wires, unused floor drains covered by supplies or machinery, ventilating grills, etc., for possible water seepage.

Secure flood fighting and clean-up supplies (rubber boots, brooms, squeegees, flashlights & batteries, oil lanterns, fire extinguishers, boats, and life preservers).

Check strength and height of nearby levees.

Place sandbags in doorways and low windows.

Install pumps or steam siphons in basements.

Install standby generators on high ground or platforms for emergency power and pumping operations.

Equip sewers with flood gates to prevent backing up of water through normal drainage lines.

Fill storage tanks, both inside and outside the plant, to prevent floating and subsequent damage to other installations. Smaller tanks or compressed-air cylinders should be secured.

Brick up basement windows for permanent protection.

Install watertight doors on basement ventilation grills.

Turn off burners to prevent escape of gas and oil through water —potential sources of surface ignited fires.

Check availability of railroad locomotive or stationary engines for emergency low pressure steam supply.

Insure fire protection during and after the flood. Temporary "fire boat" can be rigged that may later be transferred to truck if city or plant fire protection is not immediately available.

► Equipment . . .

Remove all portable equipment to safe levels at first sign of danger. Records, files, and safe contents should be given priority.

Move motor vehicles.

Remove pressure gages, valves, measuring instruments or other expensive machinery parts.

Cover large pieces of machinery and machine-shop tools with heavy cover of grease, preferably a tenacious axle or transmission grease that will not be removed by corrosive, swirling waters.

Cool furnaces and ovens.

Drain coils and closed equipment, and open pipes to eliminate freezing danger in cold weather.

Calk critical entrances to machinery that could admit water.

Extend vents on underground fuel tanks to reach above the expected water line.

Hoist heavy motors to safety on permanently installed I-beams and trolleys.

► Ingredients . . .

Cancel all incoming orders, if feasible.

Place all inventory in watertight containers or move to a safe level. Otherwise, make sure there is a large enough space between stacks of ingredients and floor to compensate for expected water level. Ingredients may even be stored in trucks or vans and moved to high ground. Vehicles can be rented if a company fleet is not available.

Purchase dry ice for protection of ingredients in frozen form in case of complete power failure.

► Supplies . . .

Remove labels, cartons, shipping

FE Staff

cases, and advertising signs.

Secure or remove all supplies stored in outside areas.

Cancel all incoming orders.

► **Finished Products . . .**

Accelerate finished product shipments if possible.

Bring manufacturing to an orderly halt to avoid injury to in-process products.

Make tentative arrangements with other processors of your product to supply your customers' needs should your plant become incapable of production for an extended period of time.

After Water Has Receded

► **Building . . .**

Restore electricity, gas, water, and fire protection as soon as possible. Have water supply tested by local health authority. If unsafe, make sure that all water is boiled before used for processing or personal purposes. Outside sources of water shipment can be used.

Maintain sanitation and health precautions. Typhoid innoculations should be required for all employees. Standard procedures include regular washing of hands and face with soap and water followed by chlorinated water rinse to prevent water-borne diseases.

Wash inside plant walls and floors with soap and water followed by chlorinated water rinse. Give special attention to cracks and crevices.

Hose and brush plant area: Streets, buildings, and sidewalks.

Repair or replace wooden floors which may have warped.

► **Equipment . . .**

Guide tanks into position as water drops. If water subsides too fast, they may be diked and refloated into position later.

Clean and oven dry electrical equipment.

Clean and oil machinery. All moving parts (gears, valves, etc.) could be permanently destroyed by abrasive nature of collected sediment and should be removed for thorough cleaning.

Dry conduits with hot air. They may be rewired, if advisable, after flushing and swabbing.

Test electrical circuits for shorts.

Consider rearrangement of overall production equipment lines during restoration period.

► **Ingredients . . .**

Have all ingredients checked by local health authorities before using. Transmission of water-borne diseases through food products is a constant danger in flooded areas.

Discard ingredients which have been contaminated with dirt. Dry powdered ingredients which are merely damp may be used if solution is boiled for at least 10 min. Do not use any damp ingredients in cold solutions. Do not use any contaminated material unless it is sterilized.

Thoroughly clean ingredient containers. Methods of sterilizing include chlorine solutions, and heat applied by boiling water or steam pressure. If containers were open, discard ingredients.

► **Supplies . . .**

Remove stock from temporary storage areas.

Do not place stock in any area which has not been thoroughly cleaned.

Discard closures or containers which have become submerged, fouled, and dirty. Those in original boxes can be recovered by placing in sterilizers and steamed at 15 lb. pressure for 10-15 min. or 10 lb. pressure for 20-30 min. Allow to air dry.

► **Finished Product . . .**

Dampened cartons should be discarded. Canned or glass packed products may still be usable if relabeled, re-packed, and thoroughly cleaned. Here's how:

1. Flush thoroughly with hose to remove all visible dirt.

2. Wash thoroughly with lukewarm solution using good cleaner or cleanser. Use stiff bristle brush and scrub all surfaces paying special attention to crimps around closure. Rinse in clear water.

3. Do the same for reusable cases.

4. Place bottles and cases in chlorine solution containing not less than 100 ppm. of available chlorine (about ½ lb. of chlorine compound is necessary for 25 gal.). Bottles or jars should be inverted in solution to prevent air under closure from interfering with sterilization. Allow to air dry.

Soaker solutions must have at least 3% alkali strength, a caustic content of not less than 1.8%, and must be maintained at a temperature of not less than 130 F. for at least 5 min. (End)

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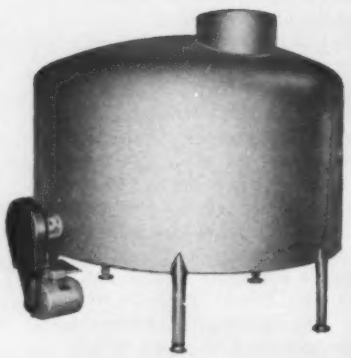

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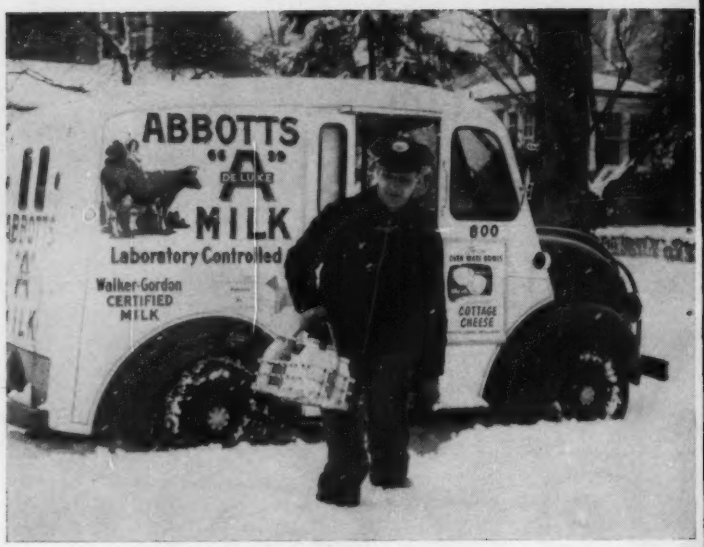
Keep Fleet Ahead of Snow and Ice



FEW WHEELS TURNED in the paralyzing 14½-in. snow that fell on Philadelphia in mid-December. But Abbotts' milk trucks made their rounds.

Every route was served on that all-but-impassable Monday.

Abbotts pushes hard to build and maintain home-delivery service. To get and hold this business, it must deliver on schedule. To deliver on schedule it makes a fetish of two things:

(1) Preparing trucks for winter.

(2) Readying trucks for emergency operation when heavy snow is forecast.

Preparations for winter driving begin in July when inventory is checked for chains and anti-freeze. Additions and replacements are purchased and sent to their 22 distribution points in mid-August. A preventive maintenance form distributed by the central office in Philadelphia keeps the distribution centers up-to-date on precautionary measures. Most important of the form's check-points are anti-freeze, batteries, carburetion, chains, ignition, and lubrication.

Anti-Freeze Control

Anti-freeze is controlled centrally. Garage foreman in all 22 distribution points are notified to install anti-freeze during a prearranged week in late fall. Each location has a chart telling how many quarts to use in each type of truck, based on the location of the center. Methyl alcohol, priced at less than half the cost of regular anti-freeze (about 50¢ per gal.), is used in all vehicles and is purchased in 50 gal. drums. About 35 drums are used per season for Abbotts' 1100 trucks in operation. Anti-freeze is strictly budgeted for maximum economy. Estimates are taken on the approximate amount needed, with a little more than the minimum distributed to each location. This has cut consumption in half.

In the beginning of the season each truck has enough anti-freeze to withstand temperatures of 15 deg. above zero. Storage drums are then filled with a stronger mixture of alcohol and water and a little is added each day until protection drops below zero. At midwinter the mix is lightened until by spring the solution is reduced to water and rust inhibitor. Sodium chromate rust inhibitor not only is very economical, but provides excellent protection.

Batteries are checked in late fall and tested under load conditions of 200 amp. If a battery is over two years old, it is generally replaced unless its test shows it to be in exceptional condition. A battery charging and storage rack is installed in each garage.

Fuel systems in each truck and main gasoline supply tanks are checked for water collection once a month throughout winter. Moisture content in the fuel system can be extremely hazardous in below freezing temperatures.

Water in main tanks is detected by "sticking" with paper that turns color if moisture is present. A sump pump with copper tube reaching tank bottom will remove water. Plugs are removed from truck tanks each fall to drain water. And glass bowl under fuel pump is removed and emptied.

10 Checkpoints for Winterization

1. Take inventory of anti-freeze and chains during summer months.
2. Examine chains for wear, put on wheels and check for fit.
3. Check water collection in fuel systems and main supply tanks.
4. Install anti-freeze (methyl alcohol) to 15F in early fall.
5. Change lubrication:
   SAE 20—In engines of trucks stored outside.
   SAE 30—In engines of trucks stored inside.
   SAE 90—In all transmissions year-around (change every two years).
6. Pull starter and wash drive with kerosene. Run dry.
7. Clean and gap points, inspect rotor and distributor cap.
8. Check plug and distributor cap points and wires for breaks or corrosion.
9. Clean and gap plugs.
10. Test batteries under 200 amp. load.

Major Items Checked . . .

. . . **Chains are carried** by each truck in Abbotts' fleet. They are hung from two hooks inside the cab to prevent rusting and entanglement (see photo). Chain

LAWRENCE J. WOODWARD
Editorial Assistant, "Food Engineering"

wear and proper fitting are checked regularly and if chains show more than 50% wear, cross links are replaced. Drivers carry monkey links for temporary repairs. Normally a set of reinforced bar link chains will last one season, depending on the truck route and number of times used.

. . . **Proper ignition** is given close attention. Points are cleaned and gapped in late fall and the rotor, distributor cap, and wires checked for damage. Spark plugs and distributor cap boots are examined for corrosion and proper fitting.

. . . **Oil is also drained** in late fall and replaced by SAE 30 for trucks stored inside, and SAE 20 for those stored outside. SAE 90

STANDARD DIVCO route truck is equipped with Meyers snow removal blade. By removing three pins, blade is quickly and easily detached.

CHAINS are hung from two hooks inside cab to prevent rusting and entanglement. Ice scrapers are hung beside chains in trucks stored outside.

is used in transmission and rears and changed every two years.

. . . **Starters are pulled** for outside storage units and the worm gear washed down with kerosene to remove grease. These are run dry throughout winter to eliminate sticking and failure to engage in engine starting.

Emergency Operations

With preparations complete, the fleet awaits advanced storm warnings before swinging into emergency operations. All supervisors and foremen are responsible for checking local weather forecasts. If snow is predicted for their area, central is contacted. Central decides whether to use chains or not and usually the decision is held if there's a chance of being missed by the storm. But, the trucks are always chained before the snow comes.

Time is of the utmost importance in a local route operation of this sort. Garage personnel as well as drivers are made an integral part of emergency operations. Normal work is completed as soon as possible so that trucks can be chained before morning.

In the chaining operation, one man drives the truck onto the lift, another raises the lift, and two others place the chains on each of the rear wheels. With such teamwork as many as 125 trucks can be chained in 16 man/hours.

If temperatures drop below 20 deg. during the night, one of the mechanics comes in early and starts the trucks for the drivers. Any problems in starting are therefore ironed out before the morning rush. Drivers are asked to come in an hour or so early so that they may help out where needed.

Two standard Divco route trucks have been equipped with Meyers snow removal blades at the Chester, Pa., and Philadelphia distribution points and are used for clearance of driveways and parking lots around the garage. Streets leading to main arteries are also plowed. By removing three pins, units revert to use as route trucks (see photo).

The problem now is to get the trucks on the road and keep them there. If a truck is seriously stranded, a new unit is taken to the scene and the load shifted. Then the driver continues on his route with a minimum loss of time.

The disabled vehicle is towed back to the garage by a truck equipped with dual rear wheels and dual chains. Repair work is begun immediately.

In one day as many as 22 vehicles have had major breakdowns due to snow, but all of them were ready for service the following morning. A highly efficient maintenance staff plus an ample reserve of spare transmissions, rears, axles and other parts are responsible for such swift action.

An 85-year-old firm, Abbotts serves ice cream dealers in five states (Del., Md., N. J., N. Y., & Pa.) and Wash., D. C., with local milk delivery routes in the tri-state area of Pa., N. J., and Del. It's a big job, but sound management and farsighted organization do the trick. (End)

10 Checkpoints for Emergency Operations

1. Make foreman and supervisors responsible for knowledge of local weather.
2. Maintain a list of addresses and phone numbers of key personnel for emergency alert.
3. Notify garage personnel and drivers that snow is predicted.
4. Finish normal work ahead of schedule to free mechanics for emergency use.
5. Begin preparations 24 hours in advance.
6. Chain trucks before snow comes.
7. Start trucks before drivers arrive.
8. Prepare snow plow equipment.
9. Replace seriously damaged vehicles.
10. Repair damaged vehicles immediately.

Automatically-loaded sleeve-type shipper—of thinner, lighter material—uses less warehouse space, lowers transportation charges

SOME DIFFERENCE: Research Project Leader Samuel Lanham, of Baker Div., holds Bax flats (right) against same number of corrugated flats.

Paper 'Tube' Slashes Distribution Costs

ECONOMICAL, LIGHTWEIGHT new-type shipping case that promises big savings all the way from in-plant carton-loading to in-store shelf-stocking looms as the newest tool for cutting critical distribution costs. A prefabricated "tube" of reinforced single-ply specification kraft, the shipper is viewed as a direct competitor with corrugated cases for certain products.

Special design of the "tube" enables it to snug-fit contents so tightly that each packaged item acts as a centerpost—thus minimizing shock transmission. As a result, thinner, lighter materials can be used—which means lower costs and tare weight.

Shipper comes with a newly-devised end-loading machine that forms the carton, inserts product contents in a honeycomb pattern, and seals the case. Machine's capacity: 20 cases/min.

General Foods, after several months of rigorous testing, stresses these significant advantages for the container:

...1) Lower packaging costs—since a 30-lb "tube" compares favorably with a 126-lb corrugated carton.

...2) Appreciable space savings—both in the plant (inventory cube is reduced one-third) and in customer warehouse (by as much as 14% to 17%).

...3) Damage protection that is as good as, or better than, that provided by corrugated boxes.

...4) Improved palletization—because rectangular shape, and 1-tier loading pattern, help reduce the possibility of built-up stacks tipping over.

...5) And greater customer satisfaction—as result of built-in zip-opener that speeds up price-marking.

How It's Done

Specifically designed for self-supporting rigidly packaged items, the tube is used by GF's Franklin Baker Div. for canned coconut (tin size: 201x400). A second user, Pillsbury, adapted it for refrigerated biscuits in metal-end paper cans.

For tinned items, shipper is lined with reinforced strips to prevent can edge from denting the paper tube. Such reinforcement may not be needed for products packed in folding cartons—for example, frozen foods, cake mixes, or instant puddings.

At GF, here's how the new system works:

An operator, standing by accumulator table where filled cans are received, passes tube flat (called Bax) through a roller. Emerging from roller, the flat snaps into a rectangular-shaped box (with its opposite ends in open position), then travels to loading point.

Concurrently, cans proceed along steel mesh conveyor to magazine loader 24 at a time—6 rows of 4 tins each. **As the tube is squared up, T-shaped ram pushes cans into the sleeve in such a manner that the two center rows are thrust slightly forward ahead of the other rows.**

Object here is to avoid having all the cans pushed the same length, which would tend to push sleeves out of alignment. At the next index point, rams on either side of the tube (1) square up the cans evenly, and (2) "line up" the shipper for snug fit.

Carrier chain then moves filled shipper to gluing station. Here, GF replaced original electric eye set-up with its own adaptation after it was found that lighting often threw the photocells off—i.e., direct lighting would cause gluer to emit adhesive even when there was no case in position.

Six "glue fingers" on each side of the conveyor, mechanically activated when case is in position, pump glue onto the inner and

More On The Way

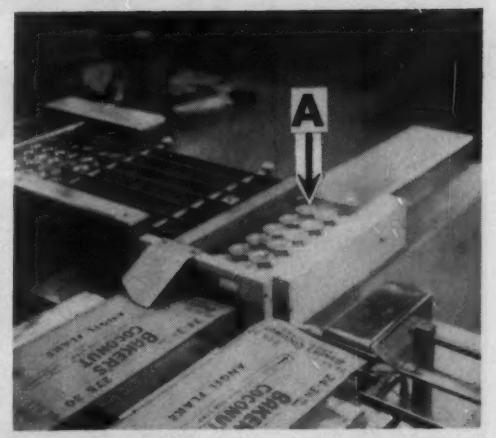
Cost economies of the Bax tube have spurred other outfits to come up with rival versions. At least two suppliers, International Paper and Hayssen Mfg., are rushing their entries to the market. One of the models is being tested with frozen food folding cartons and instant pudding boxes.

Big problem is said to pivot around the loading step. Trick here is to get cans lined up and inserted into the tube-type shipper without having the rams burst the thin paper walls.

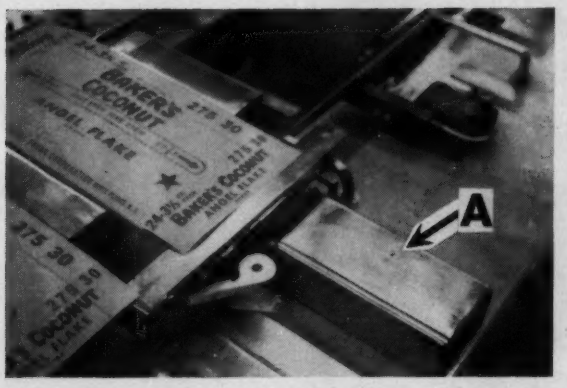
THAYER C. TAYLOR
Associate Editor, "Food Engineering"

Here's Close-Up of Revolutionary New Shipper

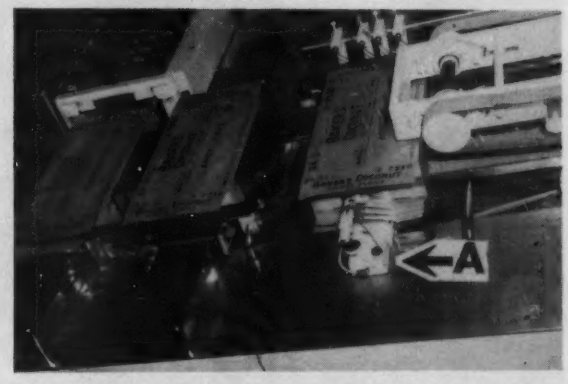
CANS roll down chute from processing area onto accumulator table, where handler checks for faulty tins.



AFTER sleeve snaps into erect shape, electrical switches at end plate (A) trigger ram that thrusts cans into shipping units.



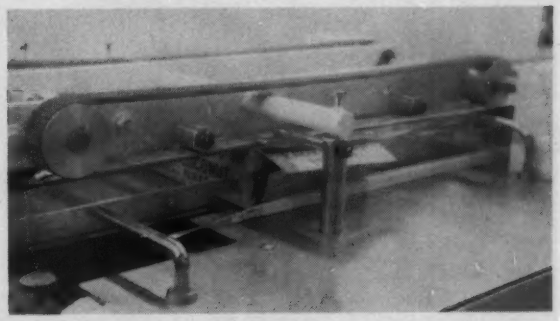
CANS are then squared up by air cylinder (A), which also lines up paper tube, thus assuring tight fit.



MECHANICALLY-OPERATED glue fingers (A) trace adhesive along inner and outer side of bottom flaps.

outer sides of the bottom carton flaps in a front-to-back motion. Pneumatically controlled, "glue fingers" are positioned to avoid putting adhesive on the cans.

In the final step, case and flaps are held under pressure until glue sets, after which cartons are stacked onto a pallet.



PLOWS then close up end flaps as shipper moves to compression chamber where end-sealing takes place.

Where Pay-Off Is

As with all GF innovations, the new shipper was thoroughly field-tested to make sure it gives customers an added service or saving or both—a key part of GF's market planning. Reports indicate that new shipper returns sizable economies in the shipping and warehousing areas.

For example, test shipments to five GF distribution centers showed satisfactory protection against in-transit damage. Long distance hauls showed that of 18,992 Bax units, only 0.56% were damaged vs. 0.84% of 19,024 control units.

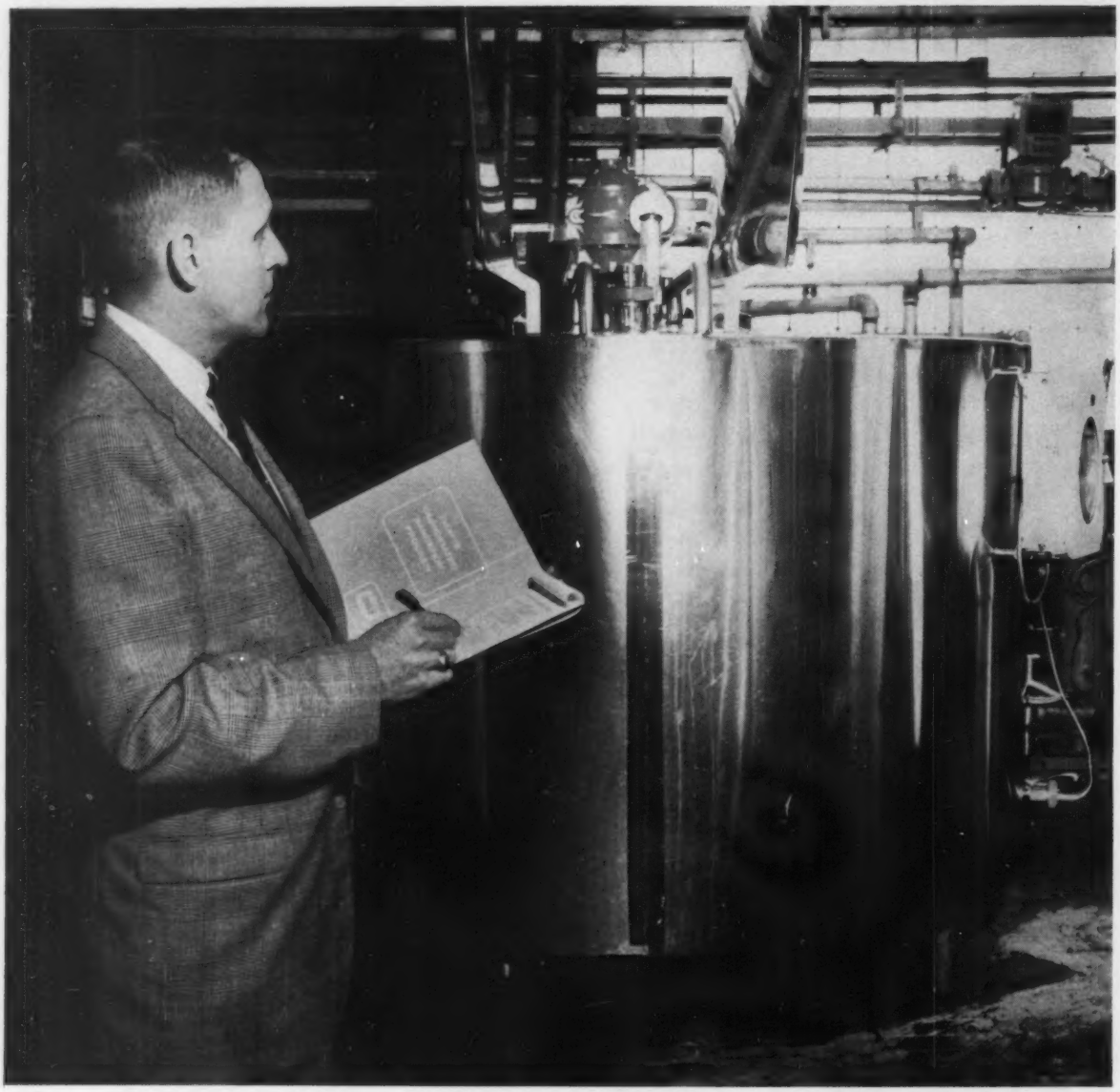
Because the sleeve is rectangular in shape, cartons can be palletized in a reverse pattern, tier upon tier. As a result, pallets are stacked higher than previously. Distributors report a 14-17% saving in warehouse space as a result of this.

At the store level, zip-open liner, and 1-tier loading pattern, have speeded up price-marking and shelf-stocking. Now, store clerk price-stamps cans in one continuous motion. Before, he had to mark one row of cans, then turn pack over to stamp 2nd row.

The Bax machinery, developed by St. Regis Paper Co., will reportedly fit in with existing production lines. Complete assembly for the entire operation runs 20 ft. 8 in. in length, is only 6 ft. wide at its widest point.

St. Regis leases the unit, making it an operating expense, instead of capital outlay, for users. Firm sees the tube as competitive with 125-175 lb. corrugated. It's estimated that food industry accounts for 26% of $2-million corrugated volume. (End)

Oakite Coordinated



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pinpoint savings for food plants

Here's how to put a sanitation expert to work for you —without spending a cent: ask the Oakite man to make a Coordinated Sanitation Survey of your plant.

It is designed with you in mind to help you cut your total plant sanitation cost. And it's sure to keep your operating equipment at top efficiency for a longer, more productive life-span.

The survey is simply an objective view of your overall sanitation needs as seen through the eyes of a cleaning expert. It overlooks nothing involving cleaning and sanitation of processing equipment, plant facilities and distribution gear. It ties together all your requirements.

The results are detailed for you in a written report. The report pinpoints savings on materials—reduces to a minimum the number of soaps and powders you need. The program points out specifically where it will pay you to *mechanize* cleaning with modern, efficient equipment. It picks out areas where *in-place* cleaning is profitable. It details the savings in cleaning crew time and toil. The program is planned to provide maintenance cleaning before *trouble* occurs.

All this is certain to cut your sanitation costs. Ask the Oakite man to conduct a Coordinated Sanitation Survey in your plant—and start saving this year. Write for Bulletin which tells more. Oakite Products, Inc., 26G Rector Street, New York 6, N. Y.

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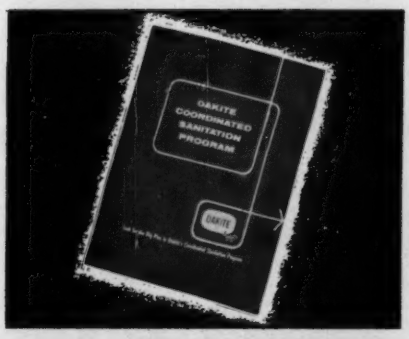

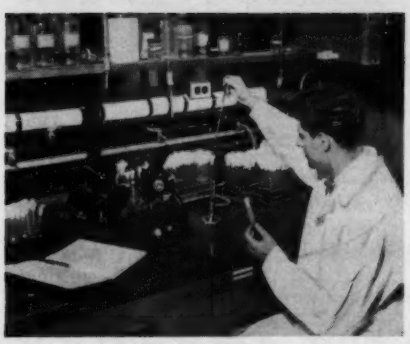

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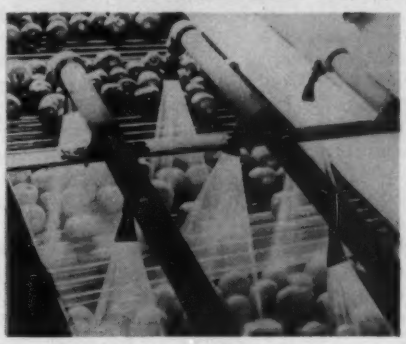

CIRCLE 99 ON INQUIRY CARD

FDA Proposes Rules for Colors

Proposals cover procedural and interpretive regulations, including definitions. Briefs on other rulings listed

IN A HIGHLY SIGNIFICANT recent issuance, the FDA proposed the promulgation of procedural and interpretive regulations with respect to color additives.

These proposals are quite extensive and range from definitions and interpretations to application of the anti-cancer clause of the Federal Food, Drug, and Cosmetic Act. Highlights presented here have been abstracted from sections pertinent to the food industry.

Proposed Definitions

"Color additives" includes any substance not exempted under section 201(t) of the act, which, when added or applied to a food, is capable (alone or through reaction with other substance) of imparting a color thereto. This includes all diluents. It also includes substances capable of imparting color to a container for food wherein the color may be imparted to the contents of the package.

Food ingredients such as cherries, green or red peppers, chocolate, and orange juice which contribute their own **natural color** when mixed with other foods are not regarded as color additives. But where a substance such as beet juice is used as a color, as in pink lemonade, it is a color additive.

An ingredient of an animal feed which by its action through the biological process of the animal is capable of imparting color to the meat, milk, or eggs of the animal, whether or not the ingredient has additional nutritive functions, is a color additive and is not exempt from the requirements of the statute.

The term "color" includes black, white, and intermediate grays, but substances including migrants from packaging materials which do not contribute any color apparent to the naked eye are not color additives. For a substance otherwise meeting the definition of color additive to be exempt on the basis that it is used (or intended to be used) solely for purposes other than coloring, the material must:

(1) If a food additive, have been approved for the intended use, and

(2) Be used in a way that any color imparted is clearly unimportant insofar as the appearance is concerned:

It is not enough to warrant exemption if conditions are such that the primary purpose of the material is other than to impart color.

If a pesticide chemical, soil or plant nutrient, or other agricultural chemical itself acts as a color, and because of this property colors the produce of the soil, it is a color additive and is not exempt.

Proposed Regulations

► **Confidentiality.** Data in a petition regarding any method or process entitled to protection as a trade secret will be held confidential and not revealed, unless it is necessary to do so in the record of an administrative hearing preliminary to possible judicial proceedings under the act.

► **Deception.** A regulation listing a color additive will not be issued if the presented data show that such proposed use would promote deception of the consumer or would result misbranding or adulteration.

► **Committee referral.** A person who will be adversely affected by any action or proposed action applying the anti-cancer clause, may before or within 30 days after publication of the order taking such action, request referral of the matter to an advisory committee for a report and recommendations.

► **Certification.** When it cannot be concluded from the presented information that there is a basis for exempting a color additive from the requirement of batch certification, it shall be appropriately listed in Subpart C of the part dealing with general restrictions on use of color additives. The ordered listing in this case shall state in detail the specifications that shall be met by the color additive.

► **Exemption.** A manufacturer, packer, or distributor of a color additive that has not been exempted from certification procedure, may make formal objections and request an order providing such exemption. Such a request shall be accompanied by full facts and may furnish reasonable grounds for the desired finding including specifically why such certification is not necessary for the protection of public health.

► **Filing objections** to regulations shall be submitted in quintuplicate to the Hearing Clerk of the Department and shall be accompanied by a specified filing fee. Each objection to a provision of the regulation shall be separately numbered.

► **Public hearing.** If the objections and statements filed by any person show that the person filing the objections will be adversely affected and that grounds for objection are reasonable, a notice shall appear in the Federal Register stating the objections and announcing a public hearing. The notice shall designate the time and place for the hearing.

► **Records.** The person to whom a certificate for a batch of color additive is issued shall keep complete records showing the disposal of all the additive from the certified batch.

Other Proposals

► **Mixtures certified.** A batch of color additive mixture which contains one or more straight colors subject to certification may be certified for use in food, subject to any prescribed restrictions, if:

(1) Each color additive used as

NOW, for watertight starter applications . . .

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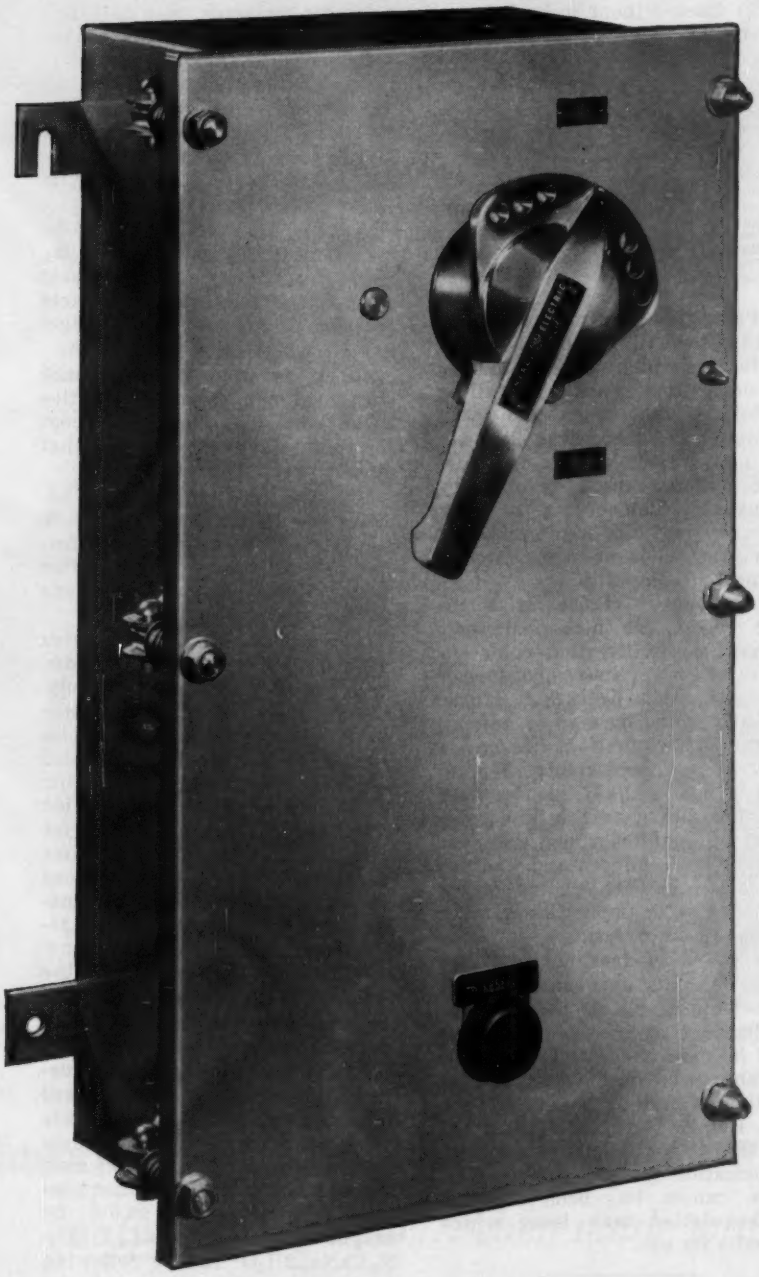

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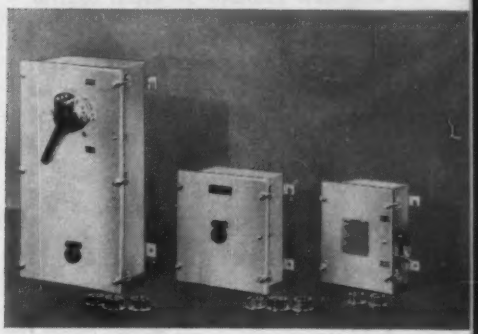

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CIRCLE 101 ON INQUIRY CARD

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an ingredient in such batch is from a previously certified batch, and such color has not changed in composition since previous certification, except by mixing into such a batch of mixture.

(2) Each diluent in such batch of mixture is from the following list:

Sodium chloride (salt).	Olive oil.
Water.	Peanut oil.
Ethanol.	Corn oil.
Propylene glycol.	Cottonseed oil.
Glycerin.	Hydrogented vegetable oil.
Glucose.	Citric Acid.
Sucrose.	Tartaric acid.
Lactose.	Malic acid.
Sorbitol.	Phosphoric acid.
Lecithin.	Tricalcium phosphate.
Starch.	Karaya gum.
Flour.	
Coconut oil.	

► **Packaging requirements.** Color additives shall be packaged in containers which prevent changes in composition. Packages shall be sealed so that they cannot be opened without breaking the seal. An unavoidable change in moisture content caused by ordinary exposure which occurs in good storage, packing, and distribution practice is not considered a change in composition.

► **Anti-cancer clause.** If scientific reports or biological tests suggest possibility that color additive or any of its components or impurities has induced cancer when ingested by man or animal, further determinations are necessary. The Commissioner of Food and Drugs shall determine whether, based on the best judgment of qualified scientists, cancer has been induced and whether the color additive or any of its components or impurities was the causative substance.

If the data does not establish causation, the anti-cancer clause is not applicable. If the data establishes that the color additive will be safe under the conditions which can be specified in the regulation, it may be listed for such use. But if, in the best judgment of the Commissioner, based on information from qualified scientists, cancer has been induced, **no regulation may issue which permits its use.**

BRIEFS on FDA Rulings

. . . **Sorbitan monostearate,** which is a mixture of partial stearic and palmitic acid esters of sorbitol anhydrides, may be safely used in or on food in accordance with certain prescribed conditions. These conditions prescribe this additive's manufacture, chemical specifications, uses or intended uses, and labeling procedure.

. . . **Polyoxyethylene (20) sorbitan monostearate,** which is a mixture of polyoxyethylene esters of mixed partial stearic and palmitic acid esters of sorbitol anhydrides and related compounds, may be safely used in or on food in accordance with certain prescribed conditions. These conditions cover the same areas as for sorbitan monostearate.

. . . **Hydroxylated lecithin** may be safely used as an emulsifier in foods under these conditions:

(a) The additive is obtained by treatment of lecithin with H_2O_2, benzoyl peroxide, and lactic acid so that the separated fatty acid fraction of the resultant product has an acetyl value of 33 to 38.

(b) It is used in accordance with good manufacturing practice as an emulsifier in foods, except for those standardized foods that do not provide for such use.

(c) The label of the food additive container shall bear, in addition to other required information, the name "hydroxylated lecithin", and adequate directions for its use.

. . . **Nylon resins, i.e., 66 nylon resin (polyhexamethylene adipamide) and 610 nylon resin (polyhexamethylene sebacamide)** may safely be used to produce articles (except food packages) intended for use in processing and handling of food. **Copolymer 66/610 nylon** may be used similarly except for milk. Each of these nylon resins must meet prescribed conditions which cover their respective manufacture, specifications with respect to qualitative tests and extractability limitations, and the procedure for determining the material extractable from nylon resins by selected solvents.

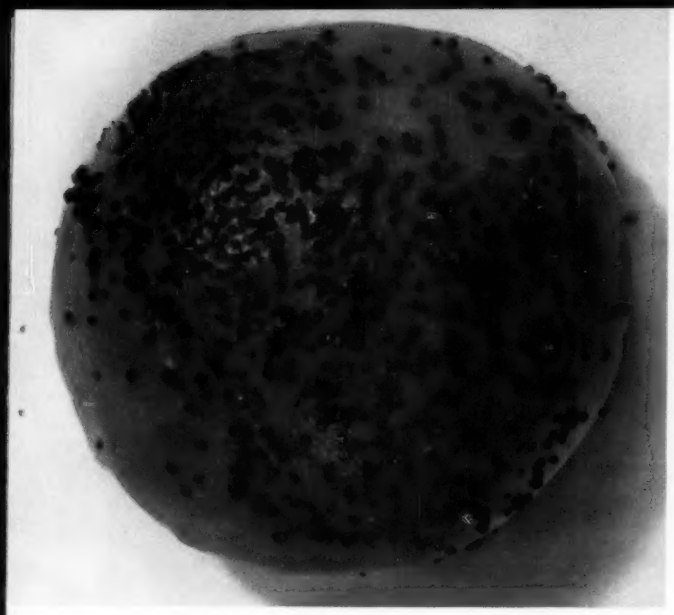
. . . **Calcium disodium ethylenediaminetetraacetate** may be used as a preservative in the products listed below, and as an antigushing ingredient in fermented malt beverages. The additive must contain a minimum of 99.0% by weight of the dihydrate $C_{10}H_{12}O_8N_2CaNa_2.2H_2O$. In the following foods, it must not exceed the levels indicated, calculated as the anhydrous compound:

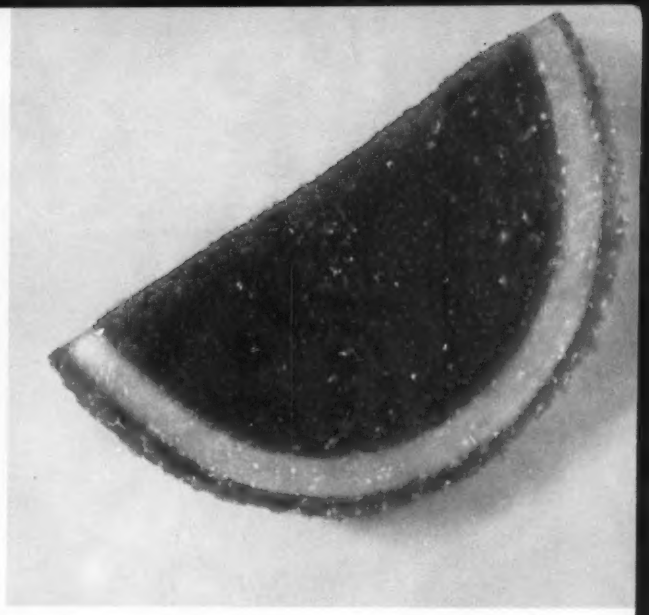
	Parts per million
Fermented malt beverages	25
French dressing	75
Mayonnaise	75
Nonstandardized dressings	75
Oleomargarine	75
Potato salad	100
Salad dressing	75
Sandwich spread	100
Sauces	75

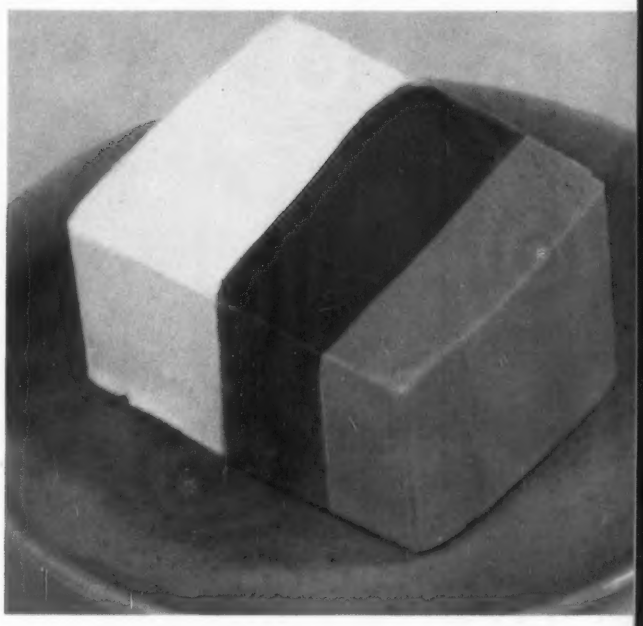
(End)

CIRCLE 102 ON INQUIRY CARD

CIRCLE 103 ON INQUIRY CARD ➔







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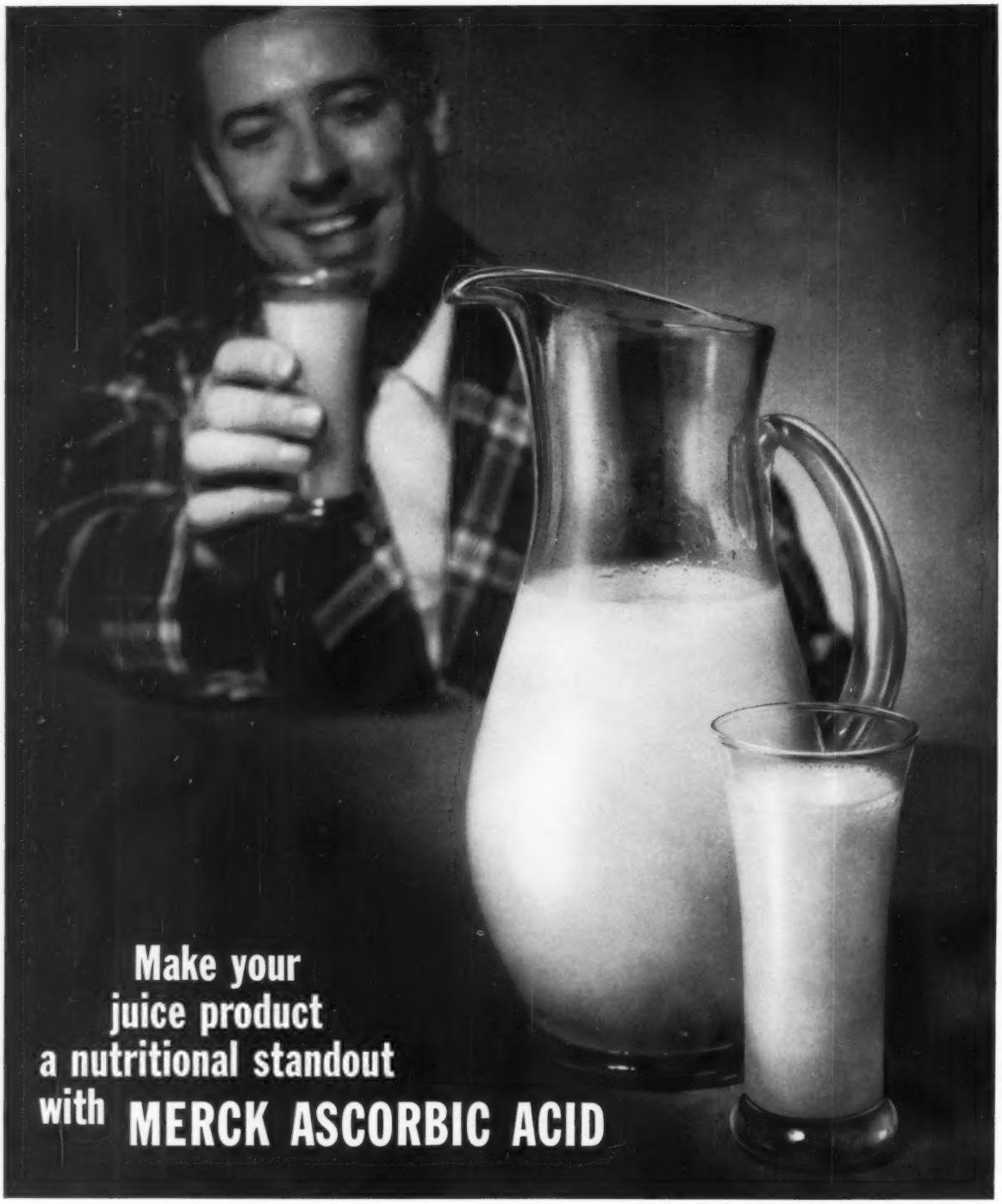

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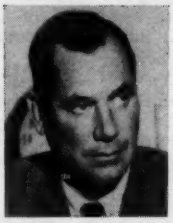
Men & Companies

Ezra Taft Benson



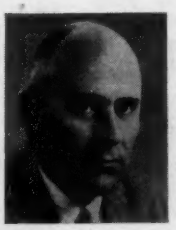
Thomas S. Gates

Top Board Posts . . . Former cabinet members in the Eisenhower administration, Ezra Taft Benson and Thomas S. Gates, have been elected to the boards of two of the nation's leading food companies, Corn Products Co. and Campbell Soup Co., respectively.

As one of the world's most respected authorities on agriculture, former Secy. of Agriculture Benson was appointed by President Roosevelt to the National Agricultural Advisory Committee during World War II. He was U.S. delegate to the First International Conference on Farm Organizations.

Former Secy. of Defense Gates has a distinguished record of government service including prior appointments as Under Sec. of the Navy, and Deputy Sec. of Defense.

John Hemingway



Robert Cosgrove

Milan Smith

NCA Elections . . . John C. Hemingway has been elected president, Robert C. Cosgrove, v.-p., and Milan D. Smith, executive v.-p. of the National Canners Assn. during the organization's annual meeting in Chicago.

Mr. Hemingway is president of H. C. Hemingway & Co., Inc., Clyde, N. Y. and Lyons Canning Co., North Rose, N. Y. He served as president of the New York State Canners and Freezers Assn. in '54 and has been a member of the NCA legislative committee since '52 and chairman since '55.

In '61 Mr. Cosgrove was elected corporate planning v.-p. of Green Giant Co. and is a former president of NCA. At GG he has held posts as assistant director and later director of personnel and public relations, and personnel and public relations v.-p. In '52 he became marketing v.-p.

Mr. Smith was president of NCA during '60 and has been active in the canning industry since '41. He held the post of executive assistant to Secy. of Agriculture Ezra Taft Benson from '54-'57 and is now president of Smith Canning and Freezing Co., Pendelton, Ore. as well as other food packing firms in Lewiston, Idaho and Milton-Freewater, Ore.

Personnel

G. Rudd McPhee takes over as v.-p. and general manager of potato chip and snack food operations at Salada-Sherriff-Horsey's recent Canadian acquisitions, Made Rite Potato Chips, Ltd., and Stratford & Watson Food Products, Ltd.

William Howlett, president of Lawson Milk Div. of Consolidated Foods Corp.,

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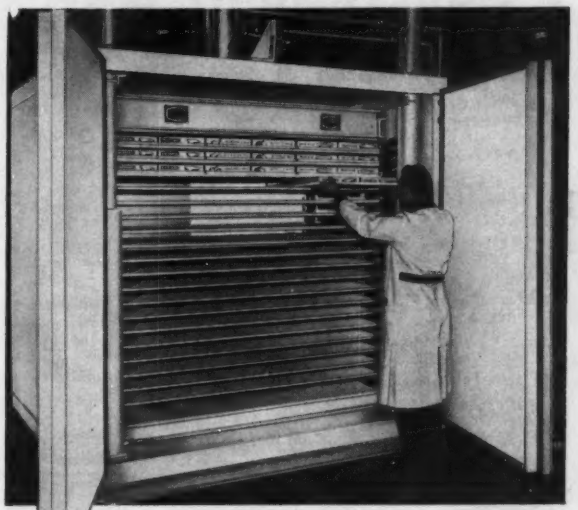

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has been elected a board member.

Terrance Hanold, Pillsbury v.-p. and treasurer, and **J. Cy Rapp,** v.-p. and general manager of Tidy House Div., have been elected to the board.

Edward T. Kenealy moves up to production v.-p. and **L. Wilbur Smith** to sales v.-p. at Borden Co.'s Western Div.

John H. Dodge is now corporate controller at Libby, McNeill & Libby.

W. Stanley Macklem, president of Curtice Bros. Co., becomes president of new Curtice-Burns Co. formed in sale of company's assets to new Pro-Fac Cooperative.

W. Earl McLaughlin, president of Royal Bank of Canada, is now a board member at Standard Brands.

Richard C. Ching, v.-p. and general manager of Foremost Dairies-Hawaii, Ltd., retired. He is succeeded by **Paul E. Heckenlively.**

Dr. Frank App, agricultural economist at Seabrook Farms Div. of Seeman Bros., Inc., retired.

Lyle M. Farmen, controller at R. T. French Co.; and **F. M. Brettholle,** comptroller, U.S. operations at H. J. Heinz Co., have been elected to Controllers Institute of America.

Robert E. Stark is now marketing research manager at Foremost Dairies.

Industry

Beech-Nut Life Savers, Inc. has acquired all outstanding stock in Martinson's Coffee Co., Inc. for undisclosed cash sum.

Miller Brewing Co. purchased A. Gettelman Brewing Co. for over $1 million.

Borden Co. is building $900,000 dry milk packaging plant at Mallow, County Cork, Ireland.

Swift & Co. has discontinued slaughtering and processing of livestock at its Cleveland plant.

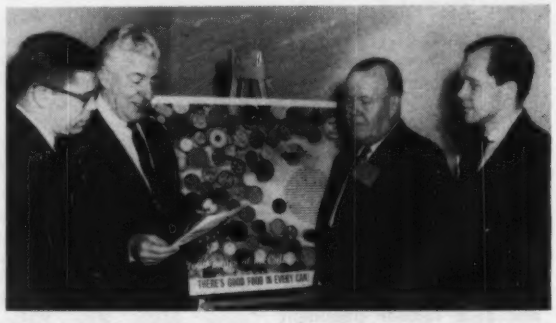
Nestle Co. completed construction of $5 million plant in Salinas, Calif. for manufacture of chocolate products.

Campbell Soup Co. announced construction of food processing plant in Australia and plans to obtain bids for new unit in Mexico.

Chock Full O'Nuts Corp. announced plans to build doughnut factory capable of turning out over one million doughnuts a day. Firm will also begin marketing its whole wheat doughnuts in frozen form next fall.

Anheuser-Busch, Inc., will increase production capacity of St. Louis plant by 20% at estimated cost of $20 million.

National Dairy Products Corp. completed transaction to acquire 80% of common and over 80% of



TREMENDOUS INCREASES IN CANNED FOOD CONSUMPTION by public feeding industry was predicted in Chicago at National Canners Assn. by speakers at an institutional marketing session. They were (left to right) J. B. Weix, Jr., Oconomowoc Canning Co.; James C. Scully, executive v.-p., Nejelski & Co.; Ora D. Chidester, v.-p., John Sexton & Co.; and Robert L. Jenkins, Allied Food Services Corp.

preferred shares of Dominion Dairies, Ltd., of Montreal.

Associated Industries

Shell Chemical Co. will build multimillion dollar polypropylene plant near Woodbury, N. J.

Neil Kingsnorth has been appointed v.-p. and general manager of new Milk Container Div. at American Can Co.

Fred H. Gowen has been elected to the board at Pfaudler Permutit.

Avisun Corp. will manufacture and market polypropylene resin, film, and fiber in Japan with completion of $30 million plant set for '62.

Atlas Powder Co., Wilmington, Del., and **The Stuart Co.**, Pasadena, Calif., are considering merger on stock exchange basis.

R. C. Can Co., St. Louis, has established Plastics Div. and will market complete line of proprietary plastic containers.

Freezing Equipment Sales, Inc., announces expanded facilities for designing and assembling custom-engineered refrigeration packages and rotary compressors.

Owens-Illinois Glass Co., Toledo, O., purchased 88 acres in City of Industry area for future use as site for manufacturing plant.

Dow Chemical Co. plans construction of a second polyolefin plant at its Louisiana division at Plaquemine. New unit will be capable of producing polyethylene as well as polypropylene.

Deaths

James W. Carkner, 81, board chairman of Pepsi-Cola General Bottlers, Inc. and former board chairman of Pepsi-Cola Co.

George Adolph Krug, 82, president of Krug Enterprises, parent company of Krug Baking Co.

Louis J. Woolf, 70, board chairman of H. Kohnstamm & Co.

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with exclusive Walnadyne

--a synergistic compound that gives these advantages--

- TRUER FLAVOR
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- DISPERSES READILY
- GREATER STABILITY
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BLACK WALNUT NO. 2047

Used ½—1 oz PER 100 LB. BATCH. Price per gallon $12.50

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CIRCLE 107 ON INQUIRY CARD

DICALITE® TECHNICAL REPORT

DICALITE DEPARTMENT • GREAT LAKES CARBON CORPORATION • 612 SO. FLOWER ST., LOS ANGELES 17, CALIFORNIA

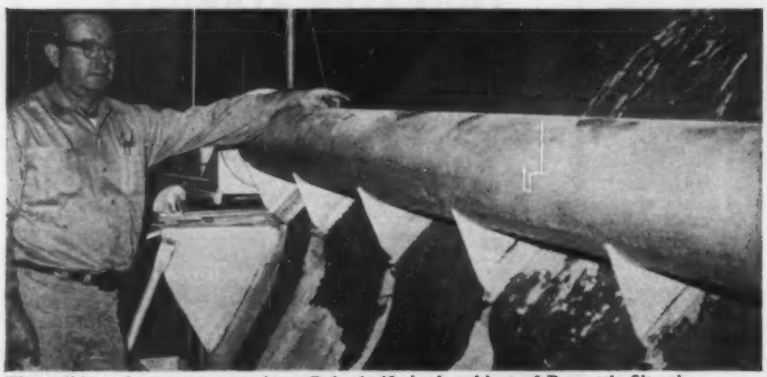
Unique Additive Filtration Discards Filtrate

Marty Harris, Dicalite engineer, reviews filtration procedure with A. H. Buck, plant manager, and R. C. Mosher, president of Barnett Laboratories.

The food additive carotene is widely used in margarine, shortening, bakery goods and pharmaceuticals where a natural yellow color and a high potency of vitamin A is desirable. A unique processing step, which might be called filtration in reverse, is employed by a leading producer of carotene – Barnett Laboratories, of Long Beach, California. Here, the liquid filtrate goes into cattle feed – and the valuable carotene is extracted from the filtered-out solids.

Barnett grows their own carrots . . . a special variety yielding at least twice as much carotene as the ordinary table variety, and taking twice as long to grow. After the carrots are crushed, the carotene is washed out and the liquid goes to filtration. A Dorr-Oliver rotary vacuum precoat filter is used, starting with an inch-and-a-half precoat of Dicalite Special Speedflow Filteraid. The knife is set for a minimum cut to remove the deposited carotene material with the least possible amount of filteraid. This material is flash dried and air conveyed to the final steps of solvent extraction and crystallization.

Dicalite, while helping Barnett work out their filtration problems, was also able to assist them in designing the flash drying air conveyor system. Careful consideration of the total process is typical of Dicalite service. We'd be glad to work with you.



The solid crude carotene coming off the knife is the object of Barnett's filtration.

© 1961 GREAT LAKES CARBON CORPORATION • LOS ANGELES, CALIF.

Dicalite's "Man on the Spot"

M. B. Harris

When Marty Harris first consulted with Barnett, they were not satisfied with their filter operation. His first step was to take samples of the carotene liquid to the Dicalite products laboratory for study. Then a series of tests was made on a miniature rotary precoat filter. Harris worked closely with a Barnett representative and the Dicalite research men on this project. His recommendations to Barnett resulted in marked improvement in filtering efficiency. Today, after continued study and improvements worked out with Barnett, the firm is getting more than double the production per hour from the same filter.

Harris graduated from the University of Idaho with a Ch.E. degree, and worked for some time with American Potash & Chemical Corporation. For the first 2 years after joining Dicalite in 1945 he worked in the laboratory on research and customer service, before going into the field as District Manager, first in San Francisco and then in Philadelphia. He now serves Dicalite customers throughout the Southwest.

Marty is entitled to add P.E. after his name, for he holds a California State license as a Professional Chemical Engineer. He has contributed articles on filtration to publications in the petroleum, sugar and swimming pool fields, and is a member of the American Chemical Society, AIChE, Master Brewers Association of America, the American Institute of Sugar Beet Technologists and the Papermakers and Associates of Southern California.

TECHNICAL LITERATURE

on Dicalite Filteraids is available on request. Bulletin B-14 discusses the principles and operating practices of filteraid filtration, and its applications in many industries.

Write for your copy to:

Dicalite Department
612 So. Flower Street
Los Angeles 17, California

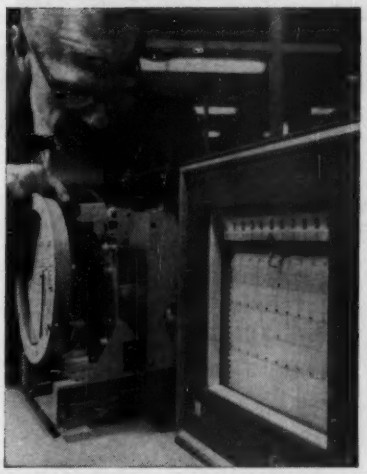
new equipment & supplies

Cuts Carton-Disposal Cost

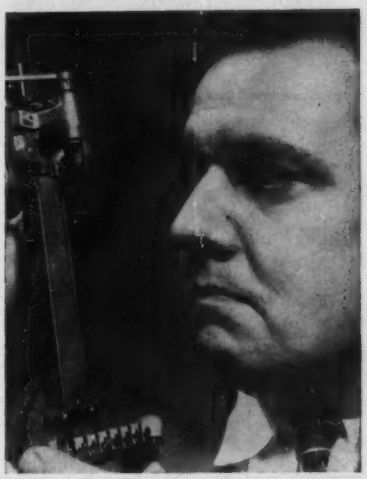
Cost of handling scrap cardboard boxes and cartons may be drastically reduced with use of a new carton shredder. It is said to cut labor needs by as much as 75%, also frees discard-carton storage areas for productive purposes.

Unit can be operated either manually or as part of any automatic system, and it keeps pace with the carton feed. Boxes may be shred to pieces of 4-12 in. Force of shredder blades throws pieces out of unit where they may be fed directly, or through air-flow systems, to bailer or incinerator.—*Mitts & Merrill, Saginaw, Mich.*

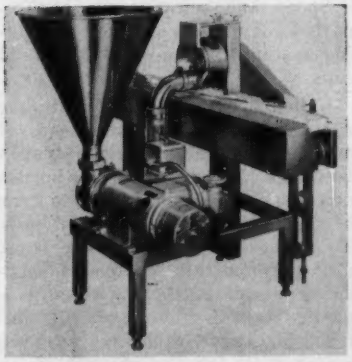
Circle 251 on Inquiry Card



ADVANCED potentiometer combines infinite resolution with thermal stability, as precision strain gage replaces conventional slidewire as the rebalancing mechanism.



STRAIN GAGE has four looped wire strands that form variable-resistance legs of Wheatstone bridge. Resistance of strands varies in proportion to applied tension.



Frozen-Food Filler

Filling speed to 200 cartons per min. and gentle product handling are advantages cited for this new frozen food filler. Products efficiently handled include spinach, squash, and creamed corn.

Known as Model 382, unit meets strict sanitary standards. In operation, its rotating filling turret allows an accurately measured fill to drop instantly into an open box. Filler is timed with and from the box opener.—*Anderson Bros. Mfg. Co., Rockford, Ill.*

Circle 252 on Inquiry Card

Process Potentiometer Uses Strain Gage

Incorporating an accurate strain gage as the rebalancing element, this process potentiometer is seen opening up a new era in a precision measurement and recording.

In eliminating the convention slidewire, unit (ElectroniK 17) achieves infinite resolution because the number of points at which a potentiometer can come to balance is no longer limited to the turns (convolution) on a slidewire. Instrument can be mounted in a standard 19-in. relay rack, on a panel or bench, or made portable. Initial production will consist of single-pen strip and circular chart recorders and a circular scale indicator, each with or without control.

In addition to a radically different rebalancing mechanism, the potentiometer offers these unique features:

1. Isolation of all critical components within an electrical shield, thus rejecting stray signals that cause recording errors and affect instrument dynamics.

2. One true reference junction compensation for all types of thermocouple actuation.

3. Transistorized plug-in control units up to a maximum of

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Reader Inquiry...Back of book

eight set points for auxiliary or zone control.

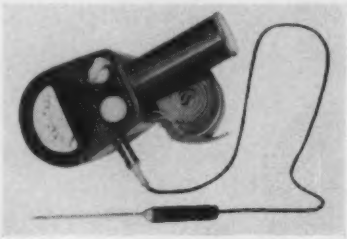
Instrument's key component is the strain gage, known as the Stranducer. It varies the output potential of the measuring circuit to balance the input signal from the process variable. Four pre-stressed looped wire strands enclosed in an I-shape frame form the variable resistance legs of the measuring circuit. Their resistance is proportional to the tension applied to them.

At zero position, the wires, fastened to a pivot arm, are in equal tension and of equal resistance. The pivot arm, as it rocks back and forth, increases tension on two of the wires and decreases it on the other two. It is linked mechanically through sector and strap reduction stages and the drive cable to the balancing motor.

Other advantages cited for the unit include: An amplifying system providing critical damping and optimum response for high impedance actuations, thermally compensated electrical networks to minimize zero shift due to temperature change, cascaded zener diode network providing a constant current to the measuring circuit and eliminating the need for periodic standardization, a new plug-in converter, and modular construction.

Calibrated accuracy of the instrument is ¼%. Strip-chart models have pen speeds of 1, 5, and 15 sec. Those for circular-chart types are 5 and 15 sec.—*Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Philadelphia.*

Circle 253 on Inquiry Card

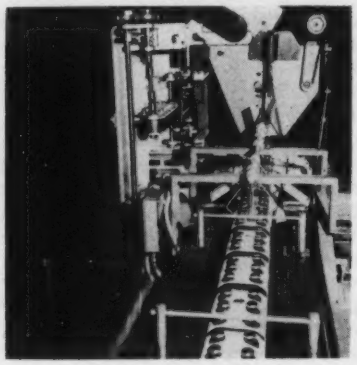


Electronic Thermometer Gives 15-Sec. Check

Designed for 15-sec. checking of frozen foods and meats in transit, this electronic thermometer accurately measures surface and internal temperatures.

Portable unit is powered by a standard flashlight battery. It consists of a stainless-steel probe with sharp tip for easy insertion in frozen carcasses, and a thermometer calibrated in two ranges —20 to 50F and 50 to 120F. In operation, unit measures resistance of a heat-sensitive nickel coil mounted in tip of probe.—*Gelman Instrument Co., Chelsea, Mich.*

Circle 254 on Inquiry Card



Six-Packs Bottles, Cans

Speed and compactness are reported advantages of a new packaging system for one-way bottles and cans.

Called "Syncropacker," unit has a single feed hopper and requires only one operator. Carton blanks feed directly from hopper to bottles or cans. Conversion from one type of pack to another takes 15 min. To reduce costly changover time, unit automatically completes packaging of all bottles or cans in a particular run. Thus, no half-finished packages must be removed manually at the end of a run.

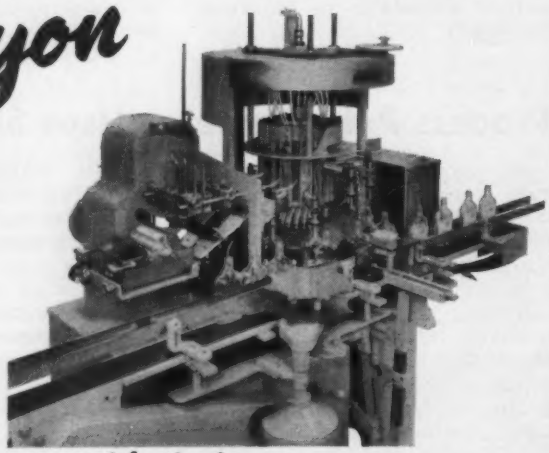
The carton used in the system (Syncropack) is of one-piece con-

The choice for quality manufacturing

Mayon

Pure Vinyl
PLASTIC FOOD TUBING

Mayon plastic food tubing is used on the BINER-ELLISON FILABELMATIC simultaneous filling and labeling machine. Another quality manufacturer using Mayon food tubing.



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★ RESISTS ACIDS, ALKALIES

Available from ⅛" to 2" inside diameter. Continuous lengths up to 100 ft. Available with stainless steel braid for high pressure applications.

The continued satisfactory performance of your equipment and machinery may well depend upon the quality of the plastic tubing you install. That is why it is *so* wise to specify MAYON *pure vinyl*... the highest possible quality. The high degree of flexibility and toughness of this finer tubing makes it particularly adaptable to intricate installations.

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struction with partitions that fit between bottles as an integral part of its structure. This provides extra product protection and easier opening of carton.—*Olin Mathieson Chemical Corp., Packaging Div., W. Monroe, La.*

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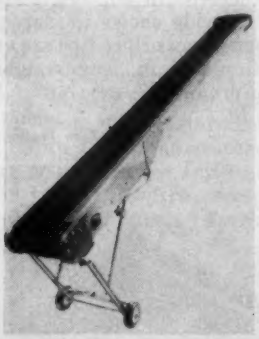

No Lubrication Needed

Here's a portable belt conveyor that never needs lubrication, hence cuts maintenance costs considerably.

Called 'Handy Boy', the greaseless feature results from use of a new sealed bearing that is also sealed against dirt and moisture. Latter eliminates main causes of wear to moving parts. Units have a 10-in. belt (on a 12-in. bed) that travels either direction at 65 fpm., and are available in eight sizes from 6-20 ft. long.—*Hytrol Conveyor Co., Milwaukee.*

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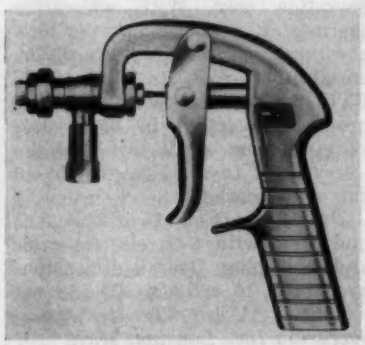


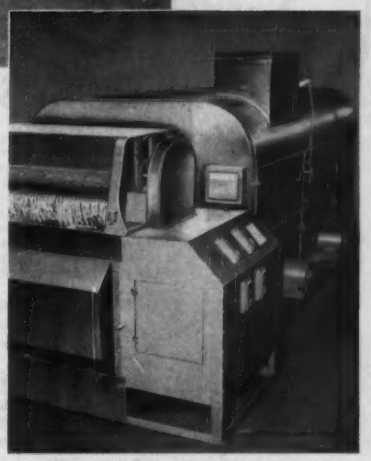
For Pest-Control Spraying

Designed for trouble-free performance and comfortable handling, this gun sprays all types of pest-control chemicals.

Called NL Gunjet, valve stem is made of stainless steel and valve seat of nylon for corrosion resist-

FLEXIBLE FOR LABS — RUGGED FOR PRODUCTION

Sargent single pass pilot plant dryer for lab or production. Each section zoned and controlled independently for widest variation of temperature, humidity.



Single pass dryer with extruder — two drying sections, one cooling section. For pilot plant or production.

DRYERS by SARGENT

For Many Food Products

SARGENT'S small to medium size dryers are outstanding examples of the sound economy of "designing and building the machine for the job" in the food industry. These flexible, rugged machines may consist of but two or three drying sections and a feeder (vibrating or standard) — or where required, multiple drying sections plus baking, curing and cooling sections — all in one compact, space-saving, economical machine.

Engineered specifically for pilot plant or moderate volume production, they are easily enlarged by simply adding more drying sections and, where desired, extruders, granulators — even a blow-up section to "fluff" products such as dry breakfast foods during drying.

Because they are designed and built by SARGENT, these rugged moderate-size workers can be depended upon to do a he-man size job on food products and by-products — from milk curd to sliced apples, from cereals to fruits and nuts and coffee.

As with all SARGENT equipment, these new-size dryers are the speediest to erect, the easiest and most economical to clean-out and to maintain of any on the market. Performance is unconditionally guaranteed by us.

Write us your product-drying requirements and let us give you details.

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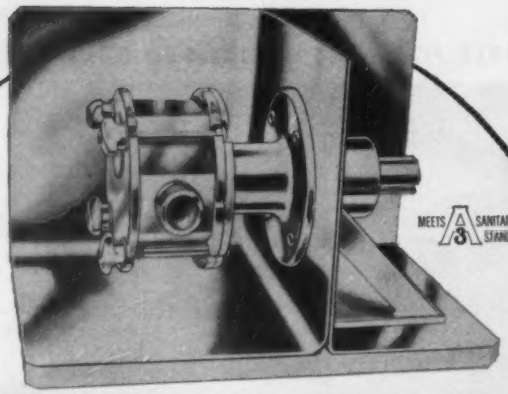

STEP UP EFFICIENCY—CUT CLEANING TIME WITH VIKING "SANITOR" PUMPS

These new sanitary pumps—Viking "Sanitors" with opposite ports—pump milk and food products more efficiently . . . require less power. Furthermore, you are assured of smooth, even flow with big capacity at slow speed. They're self-priming—available in 35, 50 and 90 G.P.M. sizes.

Other advantages include—fast take-down—easy cleaning—no tools needed to dismantle pump—no hard-to-clean internal threads and nuts—simple O-rings—no deep grooves.

Send today for complete new catalog FE, covering the entire new line of Viking "Sanitor" pumps!

50 YEARS

VIKING PUMP COMPANY

Cedar Falls, Iowa, U.S.A. In Canada, It's "Roto-King" Pumps
See Our Catalog In Sweet's Plant Engineer's File

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No wrapping machine is complete without this little "ROLAPRINTER"® imprinting attachment

Buying a new wrapping machine? Order it with a Gottscho "ROLAPRINTER" factory-installed. Adds little cost, big advantages.

Amazing "ROLAPRINTER" unit lets you imprint the package as your products are wrapped — automatically — with no direct labor cost. Cuts packaging costs, speeds production. Has a dozen uses — for imprinting codes, prices, weights, sizes, product names, promotion specials, block-outs, even complete designs. Attach it yourself on any wrapping, bundling, bag or pouch machine. Makes good legible imprints consistently with instant-drying fluid ink. Foolproof — requires no adjusting, no attention during operation. Over 1000 in use.

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ance. Chemicals flow only through the forward mounted body, thus do not touch the trigger assembly. Packing nut is immediately behind the body for easy accessibility, and trigger's leverage design gives easy on-and-off control.

Strainers are supplied with nickel-plated brass bodies and monel screens in 50, 100, and 200 mesh. A wide choice of flat-spray and cone-spray orifice tips are available. Gun is 6 in. long, weighs 11 oz. —*Spraying Systems Co., Bellwood, Ill.*

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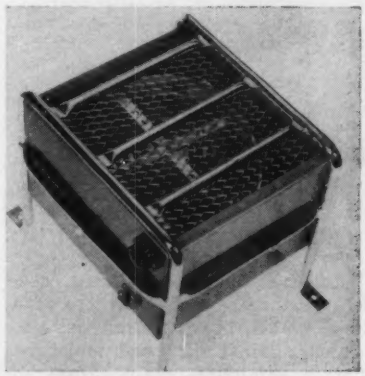

Versatile Trailer Heater

Designed for stand-by operation in trucks and trailers, this heater protects products against freezing.

Unit (Kold-Hold) may be secured permanently to body wall at any convenient location, preferably near the ceiling. Or it may be placed on the floor for overnight operation only. With adjustable thermostat, heater maintains temperatures of 35-80F. with differential of 3¾-¾F. Its 2-kw. (6,826 BTU per hr.) capacity produces product protection in body sizes ranging from small insulated delivery body to a 35-ft. trailer, in sub- zero weather.

Units operate on 115 or 230v. a.c., and come with 6-ft. electric cable and male plug. Overall dimensions are about 16 x 12 x 12⅝in., net weight is 11 lb. —*Tranter Manufacturing Inc., Lansing, Mich.*

Circle 258 on Inquiry Card

Sanitary Pedestal Sifter

Quick cleaning is a feature of a new pedestal-type sifter, designed to rigid sanitary specifications.

Unit has a split, stainless-steel

sifting bowl of 18-in. dia. that is quickly taken apart by releasing a special clamp. This exposes a circular screen frame that can be lifted out. Screen cloth is attached to a stainless-steel frame with food-quality solder. There are no ledges, cracks, or crevices to cause contamination.

Screen area is 1.4 sq. ft. Unit is activated by a ¼-hp. motor that imparts an efficient gyratory motion to the screen. Sifter can be furnished with base for stationary installation, with castors for portability, or for ceiling suspension. It is recommended for small and medium capacity, where overs do not exceed 5% of input.—*Sprout-Waldron, Muncy, Pa.*

Circle 259 on Inquiry Card

Frozen-Food Shipper

This paperboard drum for bulk shipment and storage of frozen fruit, vegetables, and concentrates reportedly will cut food processors' cost 15% by replacing metal pails.

Shipped flat, the new container saves storage space. It is a "one-tripper," so there's no return expense. Drum is coated inside and out with polyethylene, which has excellent "release" properties. Surface design and copy can be applied easily, and unit absorbs shock and resists dents.

Drum is available in a 5-gal. size, but can be made in any capacity from 4-16 gal.—*The Mead Corp., New York City.*

Circle 260 on Inquiry Card

Conveying-Air Filters Curb Food Contamination

Efficient control of purity of products handled by vacuum-type pneumatic unloading systems is

WHERE CAN A COMPANY OBTAIN INFORMATION ON THE MOST MODERN METHODS OF CONTINUOUS DRYING?

One company recently placed orders for nearly $3,000,000 worth of Surface continuous dryers. More and more chemical and food plants are using the modern services of Surface Combustion engineers.

Purchasers are demanding dryers custom designed to fit the particular problem rather than "Hand-me-downs" to complete the plant automation.

Surface Combustion engineers have many advantages to offer: Kathabar Humidity Conditioning Units; Air heaters instead of individual burners; Laboratory Facilities for testing customers' products; large organization of engineers experienced in mechanical and structural design.

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FLUIDICS* AT WORK

How to control "head space" *accurately*, every fill

Filling 190 quarts of applesauce per minute to ±1/10 fluid oz. is no problem with this Pfaudler® Rotary Piston Filler at Duffy-Mott. Always the right "head space" every fill.

In fact, most products you handle —from a spread like deviled ham to a lightly fluid evaporated milk—can be packaged to this precision with a Pfaudler filler.

What's behind such predictable and profitable accuracy? Simplicity in design—design that gives you the proper balance of smooth piston fit and small product "cushion." No surge. No leakage. No splashing.

Design that lets you adjust accuracy without stopping the filler.

Design that keeps primary moving parts to just four—piston, valve roller, valve trip cam, and valve-lock wear pad.

Of course, it's also important to match port size and piston diameter to your product. But with the wide range of fillers available from Pfaudler, this presents *no* problem whatsoever.

Preventive maintenance is a final consideration. What to look for and when to act are spelled out in detail in a monograph entitled "Factors Affecting Accuracy of Vertical Piston Fillers." Written by a member of our Filler Product Engineering Department, it covers design, maintenance and process conditions.

For your copy, ask for Reprint 540. Address your inquiries to our Pfaudler Division, Dept. FE-31, Rochester 3, New York.

*FLUIDICS is the Pfaudler Permutit program that integrates knowledge, equipment and experience in solving problems involving fluids.

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Specialists in FLUIDICS . . . the science of fluid processes

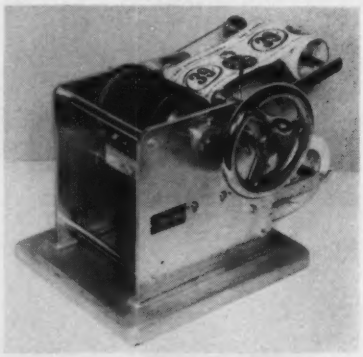
Equipment & Supplies

offered by two types of portable air-filters.

The first filters air taken into the conveying system itself and the other, a hatch filter, purifies air drawn into the bulk carrier during unloading. The conveying air intake filter attaches directly to the car-unloading nozzle by means of a slip coupling. The car vent filter is placed directly on the open hatch. Both units are of stainless steel and aluminum construction.

Filters have a replaceable cartridge that can be washed and reused—*Fuller Co., Catasauqua, Pa.*

Circle 261 on Inquiry Card



Versatile Label Maker

Heavy-duty, simple, and hand-operated, this unit produces brilliant labels and sales messages ranging in size from 1x1 in. to 5x15 in.—without any machine adjustment.

Called Model 6056-H, it is a combination printing and straight die-cutting unit that uses a variety of stocks. Dimensions: 14x17x16 in.; weight, 69 lb.—*Sohn Manufacturing, Inc., Elkhart Lake, Wis.*

Circle 262 on Inquiry Card

BRIEFS

Burner-Boiler Package Unit (Petro Pac 300), of 3-pass wet back design, offers 80% combustion efficiency. Hinged front door and simplified interior construction ease cleaning and maintenance. Ten models range 670,000-3,500,000 Btu. per hr.—Petro, Cleveland.

Circle 263 on Inquiry Card

Rotary Cottage-Cheese Filler (Model DR-1) uses simple rotating

disk for positive cup control at 70 per min. It handles most plastic containers and lids in automatic one-man operation. Changeover is quick and easy.—Triangle Package Machinery Co., Chicago.

Circle 264 on Inquiry Card

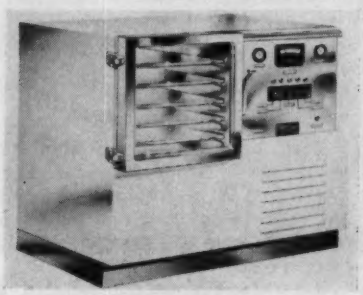
Rotary Filler (Model CF), for free-flowing solids, handles containers ranging ¼-in.-dia. by 2-in. high to 4-in.-dia. by 7-in. high. Units are custom built for production rates ranging 60-300 per min.—Frazier & Son, Clifton, N. J.

Circle 265 on Inquiry Card

Carton Former, Closer (King-Tuk) handles wide range of end-opening cartons in horizontal position at speeds to 90 per min. Available by lease, unit is quickly changed over from one carton size to another by operator.—Continental Can Co., New York City.

Circle 266 on Inquiry Card

For the Lab



Freeze-Drying Unit

Self-contained, this laboratory and pilot system for freeze-drying research requires no plumbing. Just plug it in and you are ready to go.

Unit has all necessary controls and instrumentation, integral condenser, high-capacity refrigeration, and vacuum systems. It is available in three sizes, with shelf areas ranging 11-35 sq. ft., water-removal capacity 60-170 lb.—*Vacudyne Corp., Chicago.*

Circle 267 on Inquiry Card

Cartridge Demineralizer (BD-5) with direct-reading meter calibrated in ppm. impurities and ohms indicates water purity continuously, shows when to replace cartridge. Unit uses a standard cartridge with 1,500-gr. removal capacity as NaCl.—Barnstead Still and Sterilizer Co., Boston.

Circle 268 on Inquiry Card

Container-Type Hygrometer (No. R560) gages moisture content of granular and powdered materials by correlation with samples's equilibrium humidity. Unit consists of a calibrated hygrometer that fits into top of aluminum sample container.—Abrax Instrument Corp., New York City.

Circle 269 on Inquiry Card

Automatic Carbon-Hydrogen Analyzer (Model 33) gives 8-min. combustion test accurate to ±0.2% on materials that pyrolize at below 1,100C. Sample size ranges 5-50 mg.—Coleman Instruments, Inc., Maywood, Ill.

Circle 270 on Inquiry Card

CHILLED BY HIGH FREEZING COSTS?

CONTACT KOHLENBERGER!

You'll warm to industrial refrigeration economically designed and manufactured by Kohlenberger. Here's *complete* service covering every aspect of your refrigeration needs...from equipment manufacture and system design to plant layout and field erection. Since 1922 Kohlenberger Engineering Corporation has built its reputation on the skill of its engineers . . . the dependability of its equipment. We'd like to show you how you'll benefit. Write for literature or phone LAmbert 5-3521.

1. **KMV Compresser:** 20-200 HP. Heavy duty, high speed industrial refrigeration compressor units for ammonia and freon refrigerants.

2. **KE Condenser:** Heavy duty industrial evaporative condenser. 10-200 tons.

3. **Krakice Maker:** 10-60 ton ice capacity per unit. For every crushed ice requirement.

4. **Unit Cooler:** Industrial floor-type unit cooler for ammonia, freon and brine refrigerants. 5-30 tons.

Franchises available for qualified industrial refrigeration contractors. Contact C. R. Kohlenberger, president.

KOHLENBERGER ENGINEERING CORPORATION

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New Type Organic Chlorine Powder

KLENZADE

Tri-Chloro-Cide

Non-Corrosive for All Stainless Steel Processing Equipment

NO FILM
NO SEDIMENT

Sparkles in Hardest Water!

HIGH GERMICIDAL STRENGTH

Klenzade has greatly reduced the corrosion problem common to ordinary chlorine sanitizers with Tri-Chloro-Cide — a high powered stable chlorine powder that won't pit or corrode stainless steel. Tri-Chloro-Cide is an *organic* chlorine that produces a clear, sparkling solution of exceptional germicidal strength . . . even in hardest water! Tri-Chloro-Cide is perfect for fogging or rinsing. Leaves no film or sediment. Remarkably stable, quickly soluble, excellent shelf life.

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Branch Offices Throughout America

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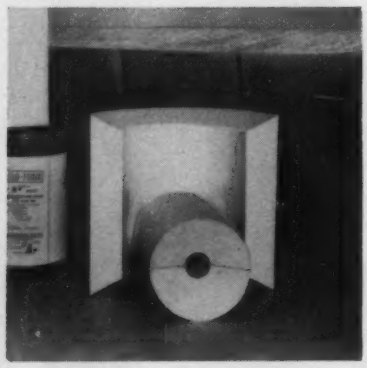
BELOIT, WISCONSIN

Plant Sanitation & Maintenance



Self-Foaming Insulation Has Many Applications

This controllable, self-foaming polyurethane insulating material reportedly can be sprayed or poured by the average workman.

Known as Flo-Foam, it has a 'k' factor of 0.14 at 75F. and moisture-vapor transmission of only 0.92 perms. Evolution of heat during the foam's 2-min. expanding reaction time creates a partial vacuum of Freon vapor in a 98% closed-cell system.

Typical applications of the waterproof material are pipe and duct work, where temperatures remain at less than 150F., and commercial refrigeration. In addition, construction costs of cold-storage units are said to be cut as much as 30% when panels pre-fabricated with a foam core are installed over a lightweight subframe. Moreover, reduction of insulation thickness increases cubic capacity—*Foam Products Manufacturing Ltd., Berkeley, Calif.*

Circle 273 on Inquiry Card

Sanitary Epoxy Finish

A permanent interior finish for walls, ceilings, and structural metal, this epoxy-resin coating cures to a high, permanent gloss called comparable in appearance and durability to ceramic tile finishes.

Known as Epo Liquid, it is available in most decorator colors and easily applied by brush, roller, or spray. It aheres to practically all structural materials. On smooth surfaces, one coat is sufficient to provide a surface free of exposed areas where foreign matter might otherwise accumulate.

Repeated washings will not mar the finish, which is non-toxic and resistant to chemicals and abrasives.—*George E. Fines, Inc., Detroit.*

Circle 274 on Inquiry Card

Plastic Tank Lining Guards Food Quality

For easier cleaning and product protection, tanks handling both dry and aqueous foods can be lined with an ivory vinyl material.

Lining (Koroseal), also recommended for tank storage of food acids, has FDA approval. It is extruded and homogenous. Sheets are tailor-fitted to each installation and joints are fused together by heat. Unlike conventional liners, they do not crack or shatter. —*B. F. Goodrich, Akron, Ohio.*

Circle 272 on Inquiry Card

Versatile Teflon Tape

Many applications are cited for an economy-grade Teflon tape where cost of plastic tape formerly has been prohibitive and substitutions inadequate. Savings are said to range 30-40%.

Known as Fluorolin 101-R, it can be used for outer protective wrappings, on release and non-stick surfaces, as protective coatings for ease of cleaning, and for wear strips.—*Joclin Mfg. Co., Wallingford, Conn.*

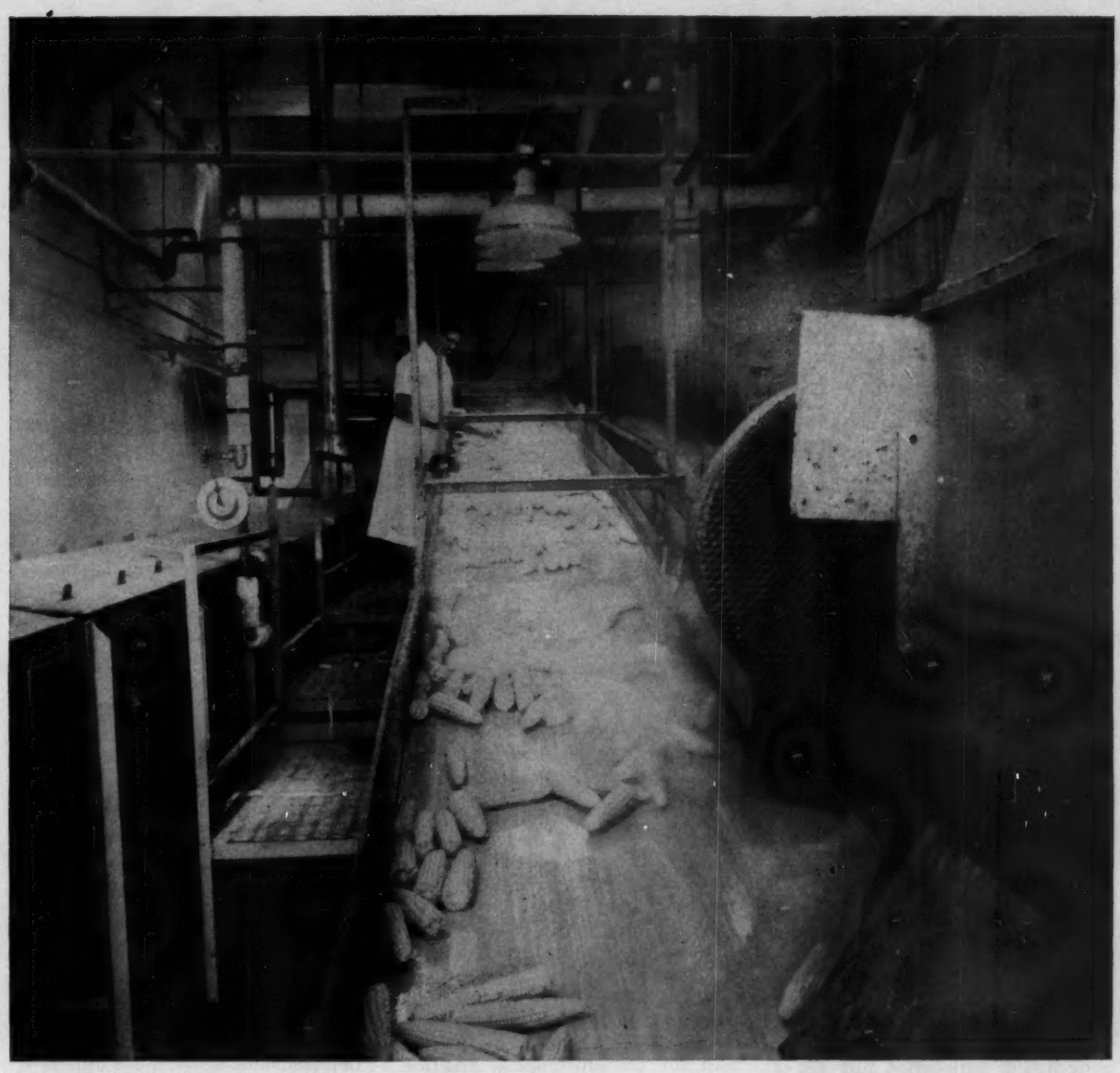
Circle 271 on Inquiry Card

Automatic Toilet Seat eliminates hand contamination, saves toilet tissue, keeps washrooms cleaner. —Washex Distributing Co., Santa Monica, Calif.

Circle 275 on Inquiry Card

Efficient Spray Cleaner (F-120) for milk tankers, storage tanks, and pipelines has built-in foam control that eliminates rinse.—Diversey Corp., Chicago.

Circle 276 on Inquiry Card



Bacteria belted out of business

B.F.Goodrich "Green Pack" belt resists moisture, mold, fungi

THE fact that the corn is so wet from washing and blanching caused trouble when fabric conveyor belts were used in this cannery. Water soaking into the belts weakened and rotted the fabric. They had to be scrubbed frequently with brushes to prevent the build-up of starch, and the multiplication of bacteria.

Then B.F.Goodrich introduced a new, improved belt, called "Green Pack", developed especially for canneries. It's made with a special rubber compound containing an inhibitor that resists most fungi and molds. It has excellent resistance to moisture absorption—3 times better than regular belts—because all plies of fabric in the belt are treated with BFG's exclusive "Hydroseal" process.

The "Green Pack" belt was tested for bacteria resistance in the cannery's laboratory, then installed in the corn-handling system. It solved the bacteria problem, and at a cost less than the belt it replaced. Since then, nearly a thousand feet of this belt have been added to help speed the processing of 11 million pounds of corn a season.

Because it's so much easier to clean, the cannery also saves 24 manhours a week per belt in scrubbing time. Corn grading is now easier, more accurate, because the gradations in shades of yellow stand out clearly on the belt's light green color.

For more information on the "Green Pack" or any of the conveyor belts developed by B.F.Goodrich for safer, more efficient food-handling, call your BFG distributor or write *B.F.Goodrich Industrial Products Co., Dept. M-969, Akron 18, Ohio.*

B.F.Goodrich

CONVEYOR BELTS

OPEN-MESH DESIGN

LA PORTE
FLEXIBLE STEEL CONVEYOR BELTS

The LaPorte flexible, open-mesh feature permits the circulation of air and liquids around products in process, reduces freezing, cooking and dehydrating time and speeds up drainage in washers and scalders. Also facilitates sterilizing with a steam gun while in motion. In addition, it assures a positive drive on the LaPorte sprocket on both stationary and portable conveyors, and prevents products from rolling off.

Ideally adapted to filling tables, LaPorte Flexible Steel Belts provide a perfectly flat surface for all types of containers, empty or filled, as well as shipping cartons.

If you freeze, can, dehydrate, pickle, package, store or ship food, it will pay you to use La Porte belts. Available in ½" x 1", or 1" x 1" in any length and practically any width. Ask your mill supplier or mail coupon for illustrated literature and prices.

MAIL COUPON TODAY

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La Porte, Indiana

Please send free literature on your Conveyor Belt.

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Food Ingredients & Additives

MOLECULAR MODEL depicts the amylose polymer, a corn-starch fraction now economically separated from ordinary dent corn.

Pure Amylose Now Commercially Available

Amylose and amylopectin fractions of ordinary dent corn are now being separated in semi-commercial quantities and in 'reasonable degrees of purity.'

Availability of pure amylose offers the possibility of edible, transparent films and coatings for a variety of foods—meats, especially sausage-type products; frozen vegetables; and specialty items. Initial uses for the amylopectin fraction will parallel those of amylopectin derived from waxy maize—dessert mixes, pie fillings, salad dressings, etc. An added advantage of the new product, however, is cold-water solubility.

Starch refined from ordinary dent corn is about three-fourths amylopectin and one-fourth amylose. Recent genetic-breeding techniques have pushed the amylose content up to 50%, but separating it from the amylopectin fraction had not been thought commercially feasible. The new process thus obviates years of genetic research that would be required to develop a pure-amylose strain of corn.

The starch fractions can be used individually or recombined in any ratio to tailor the characteristics of the polymers to any specific application. Products are called "Napol," with designations "L" for the pure amylose linear polymer and "B" for the amylopectin branched polymer. —*A. E. Staley Mfg. Co., Decatur, Ill.*

Circle 277 on Inquiry Card

High-Dextrose Corn Sugar

Corn-sugar products of higher than conventional dextrose content are now available through a new, more economical process for enzymatic conversion of starch. Standard practice is acid conversion.

The corn sugar produced is comparable to crystallized dextrose in sweetness and other pertinent characteristics. — *Grain Processing Corp., Muscatine, Iowa.*

Circle 278 on Inquiry Card

Brominated Citrus Oil

Exceptional stability to sunlight and high temperature is reported for a recently developed brominated citrus-source weighting oil.

Called Gravitol 'C', it has proved stable in beverage bases, syrups, and bottled drinks when exposed to sunlight for 21 days—even when stored for 45 days at 120F. Product meets all present and foreseeable requirements of the Food Additive Amendment. — *Sterol Derivatives, Inc., Los Angeles.*

Circle 279 on Inquiry Card

Lactic-Acid Solution, 82% dextrorotary isomer, minimizes undesirable flavors in products made by lactic-acid bacterial fermentation.—Miles Laboratories, Inc., Elkhart, Ind.

Circle 280 on Inquiry Card

Blue-Cheese Flavor, containing the significant volatiles of the natural product, enhances salad dressings, cheese dips, and spreads. Product (Tru-Blu) is available in plastic and liquid form. — Paul-Lewis Laboratories, Milwaukee.

Circle 281 on Inquiry Card

BUSY ALL WEEK, Mack B and H Models of H. & S., Inc., Jacksonville, Fla., are washed and checked on weekends. This fleet makes as many as ten trips daily to super markets throughout southeastern states. Macks' freedom from downtime is one key reason why H. & S. is almost exclusively Mack equipped.

HOME ONLY ON WEEKENDS

So remarkably free from downtime are the 20 Macks of H. & S., Inc., that you'll only see them at home when the week's work is done. The week's work? Hauling 68,000-lb. GCW loads of refrigerated groceries to the Florida, Georgia and South Carolina super markets of a large national food chain.

In this kind of hauling, where uninterrupted delivery is all-important, H. & S.'s Macks not only stay on the job, but the Thermodyne® diesel engines that power them return a steady seven miles per gallon of fuel day after day at 50 mile-per-hour road speeds.

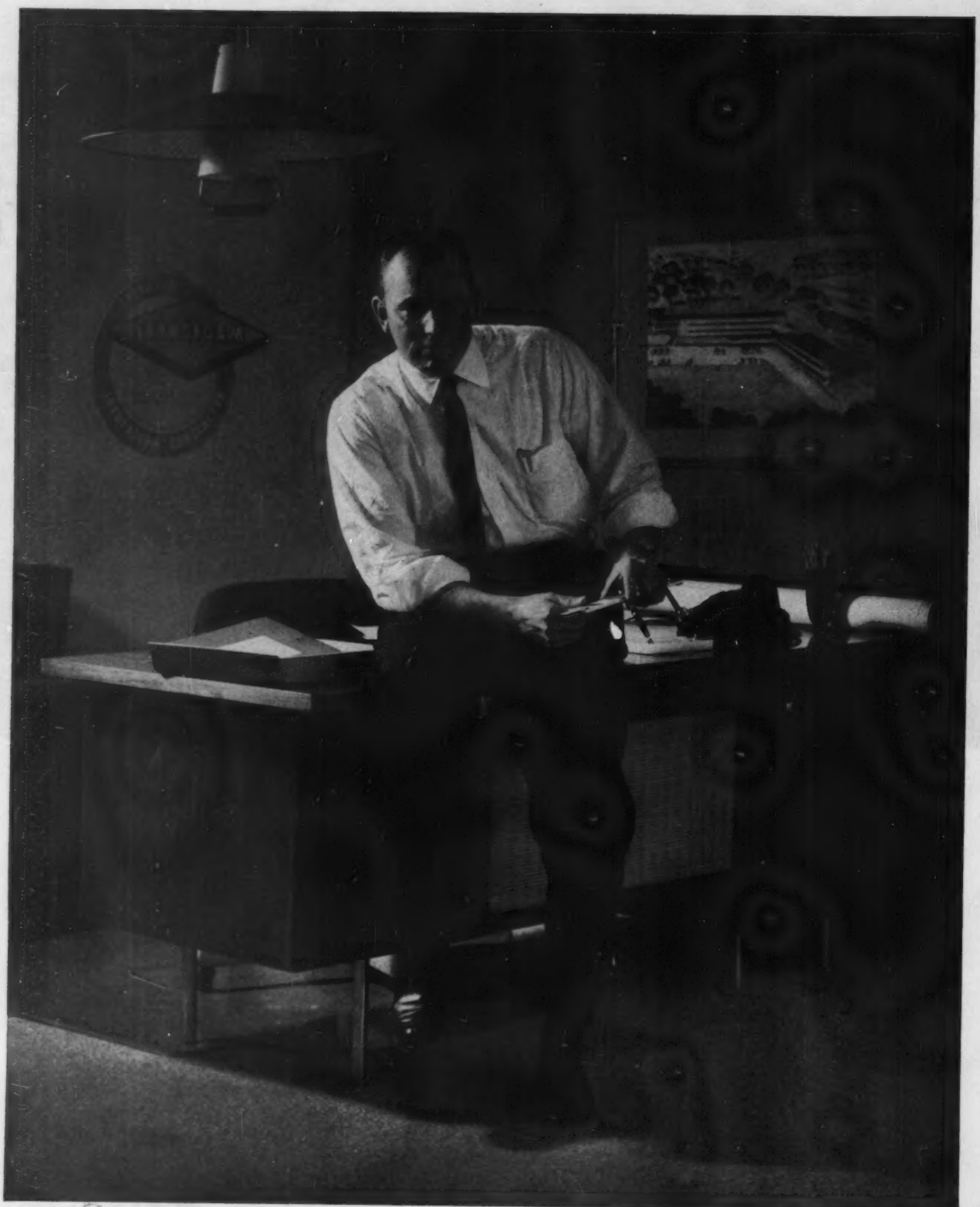
"With Macks, we've had the fewest number of road calls we've ever experienced," says Mr. Paul E. Holstun, Executive Vice President. "Taking everything into consideration—freedom from downtime, fuel economy, road performance, dependability and over-all cost of operation—I do not know of any equipment that can match Macks."

You'll be just as high in your praise of Mack performance and dependability once you see what they can do in your operation.

See your Mack branch or distributor for the Mack made expressly for you. Mack Trucks, Inc., Plainfield, New Jersey. Mack Trucks of Canada, Ltd., Toronto, Ontario.

MACK FIRST NAME FOR **TRUCKS**

CIRCLE 119 ON INQUIRY CARD



This man knows STYROFOAM® and low-temperature installation, too

HE'S AN APPROVED INSULATION CONTRACTOR, typical of the special group of low-temperature insulation contractors that Dow has selected for their outstanding experience and abilities in installing Styrofoam. Each Approved Insulation Contractor listed below has a reputation for top-quality workmanship. All 103 of these firms are thoroughly familiar with Dow recommendations for installing Styrofoam, and they are committed to follow these recommendations on every job.

Consult an Approved Insulation Contractor when you're planning your next freezer or cooler room. The superior *insulating* performance of Styrofoam, teamed with the superior *installing* performance of an Approved Insulation Contractor, is your assurance of a top-quality job.

Styrofoam is a registered trademark of The Dow Chemical Company. It is applied only to the homogeneous expanded polystyrene made according to an exclusive Dow process. Styrofoam brand insulation board is available only from Dow and its authorized representatives.

SAVE THIS LIST FOR REFERENCE

For the best low-temperature installation, get in touch with the Approved Insulation Contractor near you.

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Badham Insulation Company, Inc.
Bonitz Insulation Company of Alabama

ARIZONA

Phoenix
Barrett & Homes

Tucson
Arizona Insulation Company, Inc.

ARKANSAS

Little Rock
J. C. Lewis Company

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Fiberglas Engineering & Supply Div.

Los Angeles
Armstrong Contracting & Supply Corp.
Fiberglas Engineering & Supply Div.
Los Angeles Cork Company
Industrial Building Materials, Inc.

North Sacramento
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San Francisco
Fiberglas Engineering & Supply Div.
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San Diego
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W. L. Walker Co.

COLORADO

Golden
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R-S Industrial Insulation

Jacksonville
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Miami
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Tampa
Gulf Coast Insulation Company, Inc.
Insulation Contractors, Inc.

GEORGIA

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Asbestos Insulation Co.
North Brothers, Inc.

IDAHO

Boise
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Cork Insulating Company

East Moline
Low-Temp Insulations, Inc.

Peoria
Sprinkmann Sons Corp. of Ill., Inc.

INDIANA

Indianapolis
Indiana Asbestos Co., Inc.

South Bend
Midland Engineering Company, Inc.

Evansville
General Insulation Co.

IOWA

Des Moines
Low-Temp Insulations, Inc.

KANSAS

Kansas City
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Preston Refrigeration Company

KENTUCKY

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NASH PUMPS for higher Vacuums

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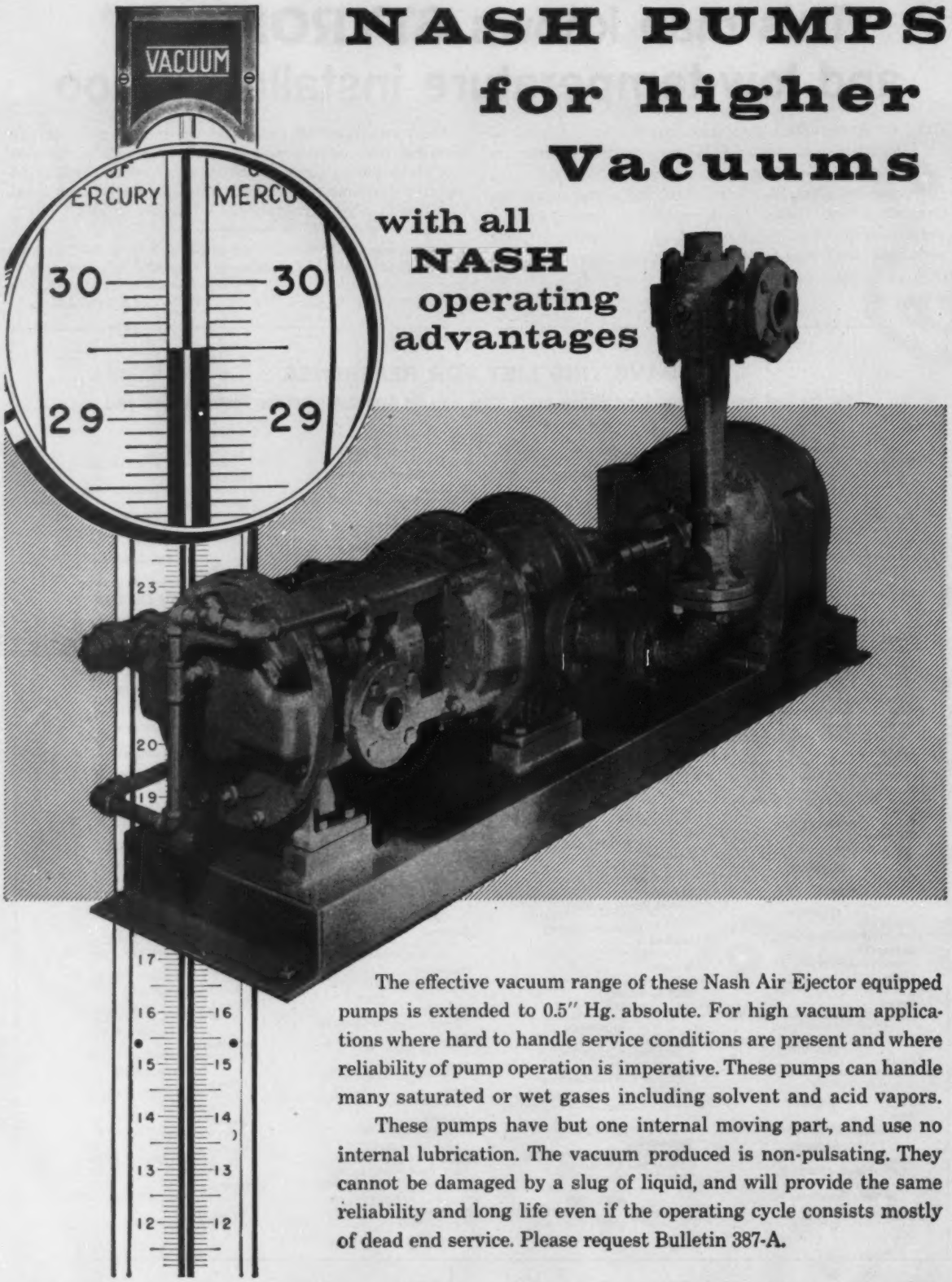

The effective vacuum range of these Nash Air Ejector equipped pumps is extended to 0.5" Hg. absolute. For high vacuum applications where hard to handle service conditions are present and where reliability of pump operation is imperative. These pumps can handle many saturated or wet gases including solvent and acid vapors.

These pumps have but one internal moving part, and use no internal lubrication. The vacuum produced is non-pulsating. They cannot be damaged by a slug of liquid, and will provide the same reliability and long life even if the operating cycle consists mostly of dead end service. Please request Bulletin 387-A.

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Free catalogs and bulletins on equipment, supplies, and services

PLANT ENGINEERING

Water Heaters. Details storage units, including selection information and illustrations. 7p. — Niagara Weldments, Inc., Niagara Falls, N. Y. (302)

Air Conditioning. Introduces new line of packaged central station units, including heating coils and air filters. 59p.—American Air Filter Co., Inc., Louisville, Ky. (303)

Corrosion Resistant Materials. Describes and illustrates 30 types with application in floors, linings, and coatings. 7p. — Ralph V. Rulon, Inc., Philadelphia. (304)

Glasteel. Provides description physical characteristics and applications. 19p. — Pfaudler Permutit, Inc., Rochester, N. Y. (305)

Miniature Filter. Details new in-line assembly for use with caustic or corrosive gases. 4p.—Dumont Engineering Corp., Long Beach, Calif. (315)

Control Valves. Details sliding gate units, including illustrations, specs, and applications. 7p. — OPW-Jordan Corp., Cincinnati, O. (307)

PACKAGING

Plastic Packaging. Outlines many applications of materials with emphasis of versatility, strength, and durability. 18p. — Eastman Chemical Products, Inc., NYC. (332)

Fillers. Describes complete line of all types of liquids, creams, pastes. 8p.—Arthur Colton Co., Detroit. (333)

Polyethylene Film. Details new formulation that has unique properties for frozen food packaging. 3p.—Eastman Chemical Products, Inc., NYC. (334)

Baler Bagger. Describes and illustrates new unit to meet high volume production needs. 4p.—Tele-Sonic Packaging Corp., NYC. (335)

Produce Packaging. Shows how to package and price-mark produce in retail stores with hints on cost and time saving methods. 32p.—USDA. (336)

Fillers. Provides specs and illustrations of several models to handle many type products. 7p.—Food Machinery & Chemical Corp., Hoopeston, Ill. (337)

Code Dating. Details the various advantages of coding packaged products, and discusses several tested coding structures. 12p. — Adolph Gottscho, Inc., Hillside, N. J. (338)

Adhesive. Describes cold setting, pressure sensitive adhesive suited for manual or mass production application of paper and paper-backed labels to polyethylene containers. 2p. — Schwartz Chemical Co., Inc., Long Island City, N. Y. (339)

MATERIALS HANDLING

Screw Feeders. Gives data on tested performance of equipment for handling of 456 different dry materials. 8p.—Vibra Screw Feeders, Inc., Clifton, N. J. (356)

Truck Refrigeration. Provides illustrations and descriptions of product construction and operational features. 16p. — Tranter Manufacturing Inc., Lansing, Mich. (357)

Gas Lift Truck. Features specs and design of new gas powered, end control unit. 6p.—Clark Equipment Co., Battle Creek, Mich. (358)

Electric Trucks. Illustrates how manufacturing techniques affect value and performance of industrial units. 12p. — The Elwell-Parker Electric Co., Cleveland. (362)

Conveyor. Photographs and diagrams illustrate features of wheel and live roller conveyors that permit accumulation on powered horizontal unit with no pressure build-up. 8p.—The Rapids-Standard Co., Inc., Grand Rapids, Mich. (363)

PROCESSING

Freeze Drying. Gives explanations of process with detailed descriptions and illustrations of equipment available in this field. 5p.—Food Machinery & Chemical Corp., Hoopeston, Ill. (318)

Dry Feeders. Details units for use where cleanliness between batches is essential. 2p. — Tower Iron Works, Inc., Providence, R. I. (319)

Ice Cream Equipment. Includes product pictures and typical flow chart of ultra high temp. process and equipment. 6p.—APV Co., Inc., Buffalo, N. Y. (320)

Vibrators. Contains illustrations and descriptive specs of firm's complete line of bin type units. 6p.—Eriez Manufacturing Co., Erie, Pa. (321)

Feeder. Provides specs and illustrations of new volumetric unit that measures free-flowing solids. 4p.—Wallace & Tiernan, Inc., Belleville, N. J. (322)

SANITATION & MAINTENANCE

Dust Collectors. Describes firm's complete line of equipment for air pollution, material handling and classification, recovery of materials from waste gases, and employee comfort. 4p. — Buell Engineering Co., Inc., NYC. (344)

Rust Prevention. Gives tips on how to remove or prevent rust safely and economically. 2p. — Oakite Products, Inc., NYC. (345)

Equipment Cleaner. Provides information on new chlorinated cleaner formulated to produce more sanitary surfaces in food processing areas. The Diversey Corp., Chicago. (346)

Exhaust Heads. Details units designed to remove impurities from exhaust steam being discharged to atmosphere. Crane Co., Chicago. (347)

Bottlewashing. Describes new compound for highly effective control of scale formation on bottles and equipment. — The Diversey Corp., Chicago. (348)

Rust Prevention. Describes zinc rich coating and explains how it can be brushed or sprayed on iron and steel surfaces to provide rust protection. 4p.—The Sealtube Co., Wakefield, Mass. (349)

(Turn Page)

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Danish Modern

for crisp greens

Lawry's new "dress" for its tasty salad dressings is easy to spot on the supermarket shelf, goes proudly right to the table.
All five members of the family stand together in just 8½ inches of shelf space.

*The sleek white cap is by WS, of course...

... as are Lawry's sifter tops for spices.

When you want good design turned into practical reality, call Wheeling Stamping.

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Plastic caps . . . pouring rings . . . sifter tops . . . liquid dispensers . . . collapsible metal tubes.

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Just Off The Press (continued)

Cleaner Cans. Outlines complete method for washing pre-mix cans to assure sanitation, control of scale build-up, and decreased contamination on valves and other washing equipment.—The Diversey Corp., Chicago. (350)

Inventory Control. Shows how to control housekeeping supplies and cut costs in this area. 4p.—Puritan Chemical Co., Atlanta, Ga. (351)

INSTRUMENTS

Flow Rate Meter. Describes unit for metering additives in minute quantities. 4p.—Potter Aeronautical Corp., Union, N. J. (376)

Temperature Control. Details differential expansion type unit with bi-metallic dial thermometer. 2p.—Burling Instrument Co., Inc., Chatham, N. J. (377)

pH Meter. Describes line-operated unit for making precise pH millivolt measurements. 2p. — Beckman Instruments, Inc., Fullerton, Calif. (378)

Bench Scales. Discusses heavy-duty units for general purpose industrial weighing. 2p. — Exact Weight Scale Co., Columbus, O. (379)

Differential Refractometers. Outlines historical aspect of units, design considerations, temperature influence on refractive index, and typical applications. 13p. — Waters Assoc., Framingham, Mass. (380)

Sight-Flow Indicators. Includes information on construction materials, dimensions, pressure ratings, and prices. 2p. — Brooks Instrument Co., Inc., Hatfield, Pa. (381)

Temperature Controls. Details complete line of differential expansion types, including general operational description. 4p. — Burling Instrument Co., Chatham, N. J. (382)

Checkweighing Scale. Introduces new unit design for use where pre-determined weight is criterion. 4p. — The Exact Weight Scale Co., Columbus, O. (383)

Tensile Testers. Presents latest developments in units for testing paper, plastics, and textiles. 4p. —Thwing - Albert Instrument Co., Philadelphia. (384)

Test Gauges. Graphically describes pressure types with emphasis on new "Zero Reference Adjust" which restores unit's reliability. 11p.—Seegers Instrument Co., Inc., Barrington, Ill. (385)

Computer System. Describes application of new analog computer to determination of complex chemical equilibrium conditions and composition. 9p. — Computer Systems, Inc., Monmouth Junction, N. J. (386)

INGREDIENTS

Flavors & Additives. Provides information on properties and prices of flavoring specialties, essential oils, aromatic chemicals, citrus concentrates, fixatives, tinctures, colors, and others. 11p. — Fritzsche Brothers, Inc., NYC. (341)

Carbon Dioxide. Outlines five areas of CO_2 applications in meat processing. 12p. — Chemetron Corp., Chicago, Ill. (342)

Cellulose Gum. Details properties and uses with section devoted to food application. 32p.—Hercules Powder Co., Wilmington, Del. (343)

MANAGEMENT

Foreign Competition. Report by Economic Advisory Committee of National Assn. of Manufacturers points out both new problems and new opportunities created by recent foreign economic development. Subject is thoroughly explored while avoiding any new policy statement and comes up with interesting conclusions.

—National Assn. of Manufacturers, NYC. (397)

Plant Security. Reviews profitable application of uniformed plant security in breweries with applications to industry in general. Common problems considered are pilferage, traffic, parking, and smooth handling of trucks. — Pinkerton's National Detective Agency, Inc., NYC. (398)

Volume Feeding Analysis. Suggests methods by which restaurant owner deals with rising wage costs and inflation in today's volume feeding market. Explores fluctuating costs of labor, employee meals, and raw food products, as well as costs for overhead and rent. 24p. — National Canners Assn., NYC. (399)

MARKETING

Consumer Preference. Presents a compilation of information concerning consumer spending as related to food products, with additional information on consumer attitudes toward new and improved brands as well as convenience items. 15p. — Nielson Marketing Service, NYC. (391)

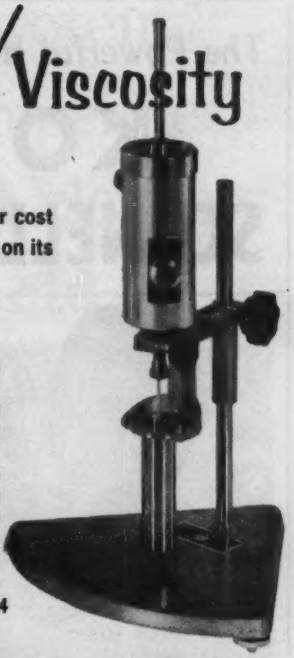
Brand Analysis. Annual home-interview study of products and brands, on-hand and in-use, in Minnesota home includes data for '57 thru '60. Separate tabulations for state and Hennepin County. 110p. — Minneapolis Star & Tribune. (392)

Metropolitan Profile. Market study of Chicago, nation's second biggest food market, includes data on household information, with population, income, and emphasis on newspaper readership. 64p. — Chicago Daily News & Sun Times. (393)

New Products. Outlines new service for manufacturers, provides special program for marketing of new products, including pre-testing, advertising, commercial introduction, research and demonstration help. 14p.— Product Acceptance & Research, Inc., Evansville, Ind. (394)

Rheology/Viscosity

Does the quality or cost of your product depend on its flow characteristics?



► A complete line of Epprecht Viscometers provide viscosity measurements in the laboratory or during processing with automatic control of viscosity.

► Measurements can be made at pressures up to 700 psi or in a vacuum at temperatures to 300° C.

For detailed technical information on Epprecht Viscometers write to **Dept. DV. 24**

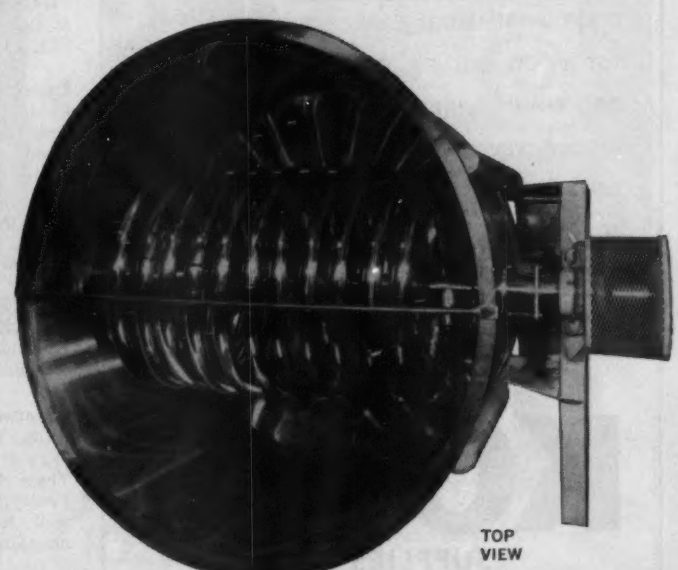
J. W. FECKER DIVISION
AMERICAN OPTICAL COMPANY

6592 HAMILTON AVENUE • PITTSBURGH 6, PENNSYLVANIA

CIRCLE 145 ON INQUIRY CARD

LANGSENKAMP . . . providing new and better ways to solve your food processing problems

rotating action of new rotary coil prevents burn-on . . . provides uniform heat!



TOP VIEW

The ROTARY COIL HOT-BREAK and COOKING UNIT shown here handles 20 tons of tomatoes an hour, quickly reaches desired temperature, and maintains it with *no* burn-on.

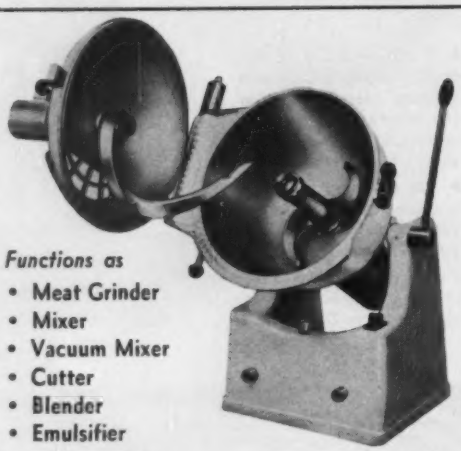
A Rotary Coil in one of your present tanks, or in a new tank, will at least *double* that unit's capacity . . . give faster, more uniform heat, and save fuel and steam.

Take advantage of these and other savings . . . write for full details, specifications and prices.

F. H. LANGSENKAMP CO. • 227 E. South Street, Indianapolis 4, Indiana

The Powerful High-Speed

KOCH SCHNELLKUTTER



Functions as

- Meat Grinder
- Mixer
- Vacuum Mixer
- Cutter
- Blender
- Emulsifier

IN A SINGLE OPERATION

Imagine... A Super Mixer that cuts, blends, and emulsifies

This very high speed mixer does in seconds what usually takes minutes. Performs pre-cutting, fine-cutting, mixing, and emulsifying in one rapid operation. Under vacuum if desired. Cuts and blends almost any animal or vegetable material, fresh or frozen, solid, liquid or paste. Capacity up to 120 qt.

Please write for full details on your application

KOCH SUPPLIES INC.

KANSAS CITY 8, MO., U.S.A.

Victor 2-3788 TWX: KC 225

Recent Inventions

PRODUCTS

Concentrated Sweetened Cream Containing Milk Fat, Non-Fat Milk Solids and Sucrose.—R. W. Bell, USDA. No. 2,959,485.

Low Sodium Sauerkraut From Fermented Mix of Shredded Cabbage and Sucrose.—V. R. Rohekaste, Edwardsville, Ill. No. 2, 960,410.

Meat Conditioner Comprising Papain, Hydrolyzed Proteins and MSG.—W. O. Fraesdorf, Jr., Tucson, Ariz. No. 2,961,324.

Dietic Food Composition Made Up of Substantially Fat-Free Food and an Ester.—A. Minich, Heyden Newport Chemical Corp., N. Y. C. No. 2,962,419.

Shortening With Major Amount of Glyceridic Material and Minor Amount of Mixture Produced From Reacted Beta-Propiolactone and Fatty Acids.—H. H. Young, Swift & Co., Chicago: No. 2, 963,371.

Pan Dressing From Edible Fatty Material Containing Effective Amounts of Lecithin and Aluminum Stearate.—H. Brody, Swift & Co., Chicago. No. 2,963, 372.

Icings Prepared From Cold-Water Soluble Agar and Carrageen Gums.—A. Monti, America Molasses Co., N. Y. C. No. 2,963,373.

PROCESSING

Method of Stuffing Poultry Into Shrinkable Plastic Bags From Which Air Is Then Evacuated. — P. B. Hultkrans, Milprint, Inc., Milwaukee. No. 2,955,941.

Encapsulated Frangible Silica Gel Matrix Body Used As Frozen Food-Thaw Indicator. — R. D. Fenity, Minneapolis-Honeywell Regulator Co., Minneapolis. No. 2,955,942.

Improving Meat by Incorporating Casein Complex, Pyrophosphate and Calcium Compound. — E. H. Freund, National Dairy Products Corp., N.Y.C. No. 2,957,770.

Coating Frozen Meat With Molten, Non-Toxic Plastic Film Substance. — L. I. Berkowitz, Newton, Mass. No. 2,957,772.

Concentrating Aqueous Heat-Sensitive Solid-Containing Liquid Into Solid Particles By Freezing and Progressive Dehydration to Separate Ice Crystals. — H. A. Toulmin, Jr., Union Carbide Co., N.Y.C. No. 2,957,773.

Producing Buttermilk by Heating and Cooling Skim Milk and Curdled Cream, Adding Lactic Acid Starter, Agitating, Again Cooling, Adding Cream and Homogenizing. — J. W. Howard, Georgia Dairies, Inc., Atlanta. No. 2,958,601.

Making Popped Corn Balls Continuously. — D. T. Gilmore, Sonneman Products, Inc., Fayetteville, Ark. No. 2,958,602.

Tomato Juice Solids Prepared by concentrating Juice With 6% Pulp and Vacuum Dehydrating Liquid Concentrate.—S. I. Strashun, USDA. No. 2, 959,486.

Freezing Mashed, Cooked Potatoes (50-70% Moisture), Granulating Frozen Product by Extruding and Dehydrating These Thin Particles.—G. K. Notter, USDA. No. 2,959,487.

Heat-Sterilizing Foods in Semi-Rigid Polyvinyl Container With Lid Made From Same Resin.—K. van de Kerke, Hilversum, Netherlands. No. 2,959,488.

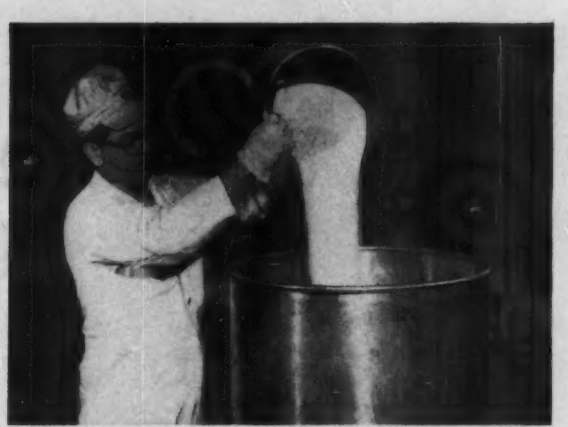
Preserving Foods That Should Be Allowed to Breathe and Ripen by Coating With Polyvinyl Actetate Resin and Wax Mixture.—A. Winterberg, Haifa, Israel. No. 2,961,322.

Continuously Tempering Chocolate So That It's Delivered to Enrober With Fat-Crystal Nuclei of Substantially Only Beta.—R. Sollich, Bad Salzuflen, Germany, No. 2,963,367.

(Continued on Page 130)

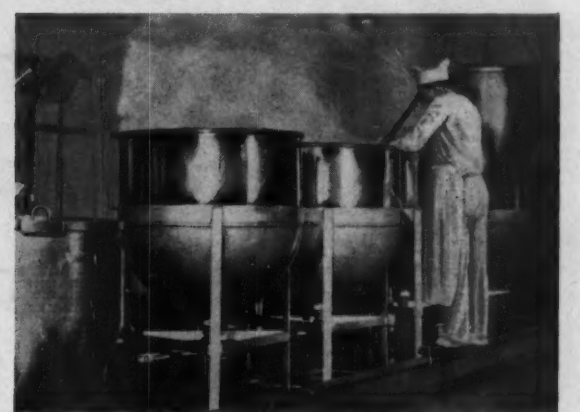
For fast removal of scale and protein deposits from cooking vessels, pipelines, evaporators, use safer **dry acid** cleaners based on **Du Pont Sulfamic Acid**

SAFER TO HANDLE. These dry acid cleaners eliminate hazards of broken carboys, spattered liquids, corrosive fumes. The cleaners are dry, nonfuming powders, packed in easily handled, disposable drums.



EASIER TO USE. Just scoop out required amounts of dry acid cleaner and add to make up tank. Often can be added directly to equipment being cleaned . . . no elaborate equipment or specially trained labor required.

ECONOMICAL. Dry acid cleaners can be accurately weighed and packaged—eliminating costly overuse by unskilled employees. These concentrated cleaners, undiluted by water, save on shipping, handling and storage costs.



GENTLE on stainless steel in removing scale and deposits. Thoughtful personnel use sulfamic-based cleaners without fear of stress cracking or pitting of expensive equipment so easily induced with hydrochloric acid.

Ask your supplier for safer, effective cleaners based on Du Pont Sulfamic Acid, or mail coupon for additional information and names of formulators who offer these compounds.

DU PONT
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BETTER THINGS FOR BETTER LIVING ..*THROUGH CHEMISTRY*

E. I. du Pont de Nemours & Co. (Inc.)
Industrial & Biochemicals Dept., N-2545M
Wilmington 98, Delaware

Please send me ☐ your "Quick Facts on Dry Cleaners" booklet; ☐ names of formulators offering cleaners based on sulfamic acid.

Name _____

Company _____

Address _____

City _____ *State* _____

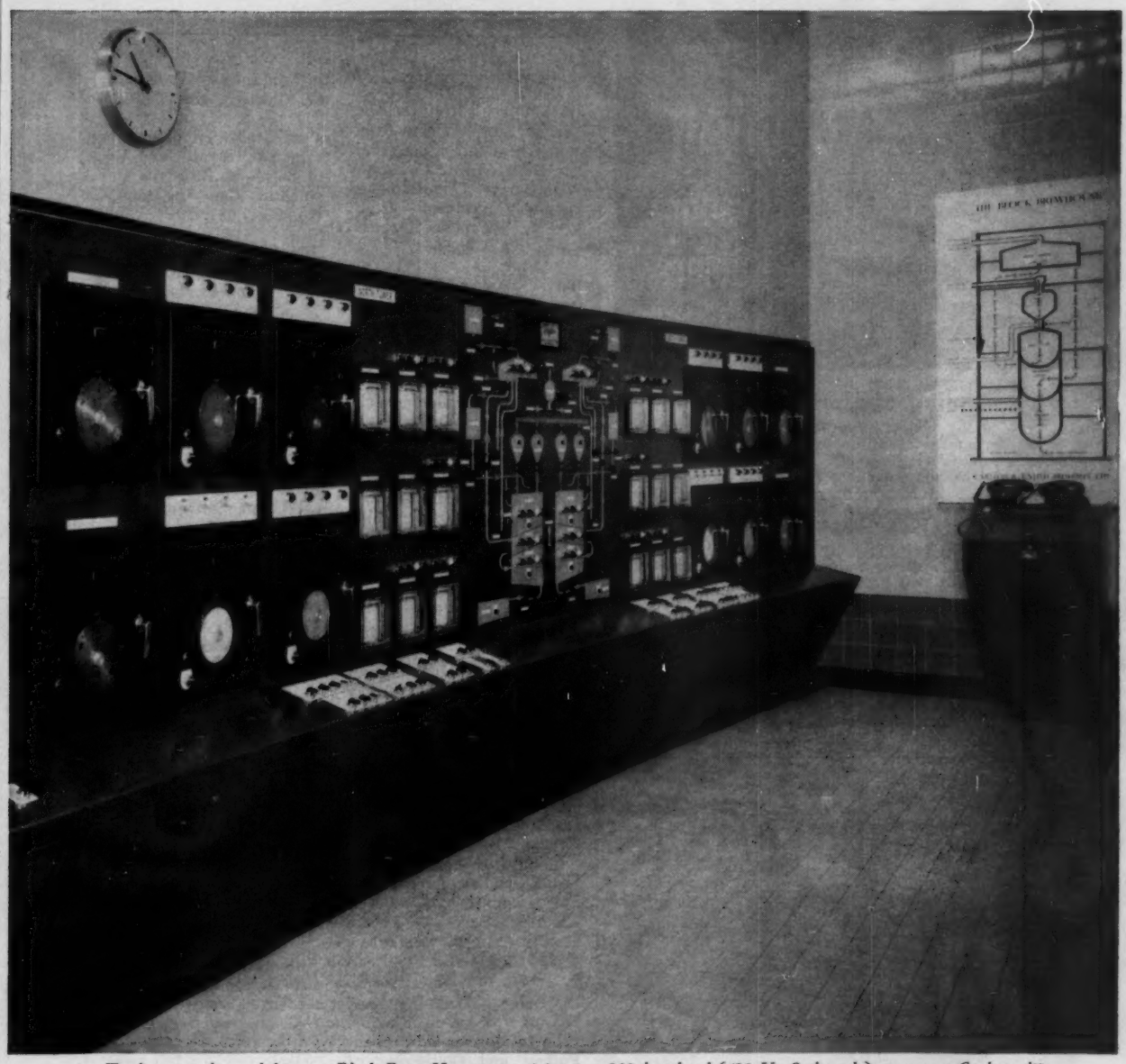
CIRCLE 127 ON INQUIRY CARD

Australian brewery controls 8 brews simultaneously with advanced Taylor system

The new Block Brew Towers at the Carlton Plant of Carlton & United Breweries Ltd. represent an entirely new approach to brewing techniques. (The term "block" derives from the manner in which the rectangular processing vessels are nested above each other in their flow sequence.) The two towers employ a master timing control system that is unique in the industry. The whole brewing operation is under the supervision of a centralized panel that provides strict control of time, temperature and flow rates for eight brews simultaneously. Key to the system is the use of a Taylor FLEX-O-TIMER® Timed Program Controller as a 'master timer' (top left on panel, marked 11). Its function is to automatically sequence the four brew-cycle FLEX-O-TIMER Controllers for each of the two towers. The "master" also insures that:

1. *The mash tuns are clear and ready to receive grists and hot liquor.*
2. *The grist bins are full to the pre-set quantity.*
3. *The automatic switch is "on" for the particular tower, i.e. North or South.*
4. *Each brew cycle timer is on "automatic".*
5. *All manual stations on panel are switched to "automatic".*

Taylor Instruments



Taylor control panel for new Block Brew House comprising two 200-hogshead (420 U. S. barrels) towers at Carlton & United Breweries Ltd., Melbourne, Australia, 8th largest brewer in the world.

The brewing cycle is programmed and controlled by the FLEX-O-TIMER brew-cycle controllers and FULSCOPE* Time-Schedule Controllers (back of panel). Additional FLEX-O-TIMER Cycle Controllers are used for the lauter tun and brew kettle schedules. The miniature TRANSCOPE* Recorders (center panel) continuously record and control the process variables such as temperature, pressure, flow and load. Another new feature is that the Lauter Tun sparge and run-off flow rates are controlled to a pre-set quantity and ratio. The ratio is continuously adjusted throughout the Lauter Tun cycle.

Each brew is identified by a different color light, shown above the instruments. Signal lights are position indicators of all control valves, slide-valves on the grist bins, etc. To the left of the master timer are numerous lock-out signal lights to indicate equipment that cannot be operated.

All the instrumentation shown on the panel above, plus a lot more not shown, was installed, piped and wired by Taylor Instrument Companies of Australia Pty. Ltd. This is another fine example of Taylor's world-wide facilities—and our ability to serve the brewing industry's instrumentation needs for even the most sophisticated control systems.

Call your Taylor Field Engineer for consultation any time. Or write Taylor Instrument Companies, Rochester, N. Y., or Toronto, Ontario.

*Reg. U.S. Pat. Off.

MEAN ACCURACY FIRST

for pre-cooling and preserving foods

Series "M" King Koolers operate with low velocities in the cooler to maintain temperatures of 34° to 50° F., using ammonia or Freon refrigerants. Centrifugal blowers pull air through the cooling coil for efficient heat transfer. Featuring automatic temperature and refrigerant control, system defrosts during off cycle. Water defrost methods are also available.

King Product Koolers are easily and quickly installed and serviced . . . assuring economy, efficiency, safety. Ceiling suspended and floor types are available in a complete range of sizes from 3,000 to 18,000 C.F.M.

PRODUCT KOOLERS
Manufacturers of
King
sharp freeze,
COMPANY OF OWATONNA
905 N. Cedar St. • Owatonna, Minn.
cooling, ventilating and heating systems.

King KLIMATIC KING "70"

assures ultra-clean air conditioning

Klimatic King series 70 units are designed to supply efficient heating, ventilating, filtering and cooling needs for food processing areas.

Air is passed through two filters . . . the first, a standard washable type, to remove larger dirt particles; the second a high efficiency dry type that has a cleaning efficiency comparable to electronic precipitators.

This exceptionally clean air cuts plant maintenance costs . . . improves quality control. Constant fresh air supply and air circulation reduces excess humidity...keeps room dry...reduces mold and bacteria growth . . . improves working conditions.

Klimatic King units are easy to clean, may be mounted in or out of building.

Write for detailed technical and information bulletins.

KLIMATIC KING
Manufacturers of
King
sharp freeze,
COMPANY OF OWATONNA
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cooling, ventilating and heating systems.

Recent Inventions (continued)

PACKAGING

Machine With Reciprocating Carrier Onto Which Products Are Loaded and Both Are Inserted Into Container With Carrier Then Removed From Container. — P. G. Perrin, Santa Barbara, Calif. No. 2,952,954.

Bottle Packer Comprising Bottle-Accumulating Magazine and Lift for Raising and Lowering Container Into Which Collated Bottles Are Packed.—H. J. Leichenich, Niehler Maschinenfabrik, Koln-Niehl, Germany. No. 2,952,955.

Bag Closing Machine With Traveling Horizontal Conveyor for Supporting Filled Bags and Bag-Top Tucking Station.—T. E. Piazze, Continental Can Co., N. Y. C. No. 2,952,959.

Infusion Bag Comprising Filter Paper Embodying Thermoplastic Material and Heat-Sealed Along Edges and Mouth and Ribbon-Like Strip Handle.—J. P. Whelan, Pneumatic Scale Corp., Ltd., Quincy, Mass. No. 2,954,294.

Insulated Perishable Food Carton With Semi-Rigid Laminate of Insulated Material Sandwiched Between Foil Laminates. — D. B. Kauffeld, Excel - O - Therm Container Corp., Lexington, Ky. No. 2,954,912.

Inert-Gas Wrapping and Sealing Cheese in Flexible Film In Manner To Prevent Puffing and Collapsing of Wrapper. — F. O. Coffey, National Dairy Products Corp., N. Y. C. No. 2,955,045.

Packaging Machine Attachment for Settling Measured Charges of Light, Fragile and Bulky Products Filled Into Formed, Sealed Pouches. — A. P. Gausman, Hayssen Mfg. Co., Sheboygan, Wis. No. 2,956,383.

Caser for Automatically Packing Cartons of Frozen Foods.—R. L. Underwood, Mission San Jose, Calif. No. 2,956,384.

Automatic "Place Packing" of Pimento-Stuffed Olives in Containers.—D. M. Heller, Chicago. No. 2,957,286.

Ventilated Shipping Container for Fruits and Vegetables.—M. B. Royce, Continental Can Co., N.Y.C. No. 2,957,597.

Simultaneous Extrusion Forming a Package and Introducing Product Into It, Then Sealing and Cutting Off Package.—J. Deckers, Liege, Belgium. No. 2,958,171.

Filling Machine Featuring Specially Designed Valve Actuator and Container Detector. — C. E. Kerr, Food Machinery & Chemical Corp., San Jose, Calif. No. 2,958,346.

EQUIPMENT

Integrated Apparatus for Continuously Producing Cracker Meal.—P. M. Angell, Chicago. No. 2,956,519.

Impact Mill for Separating Materials Into Parts of Different Specific Weights. — E. Andreas, Munster, Westphalia, Ger. No. 2,957,633.

Apparatus for Selecting Samples of Predetermined Weight.—C. W. Brabender, The Pillsbury Co., Minneapolis. No. 2,957,673.

Automatic Head Dropper for Stripping Heads Off Conveyed Shackled Poultry. —C. L. Curtis, Turlock, Calif. No. 2,958,092.

Cheese Cutter With Reciprocating-Type Hollow Punch. — L. H. Bohman, Rochester, Ind. No. 2,958,129.

Peanut Applier for Apple-Coating Machine.—H. Pikal, Bangor, Mich. No. 2,958,308.

Coring and Slicing Machine Used for Such Products as Bell Peppers.—G. E. Ogelvie, Hayward, Calif. No. 2,958,353.

Vegetable Slicer With Rotatable Cutter Assembly Mounted Within Housing Open at One End.—H. K. Waig, Portland, Me. No. 2,958,354.

CIRCLE 130 ON INQUIRY CARD

CIRCLE 131 ON INQUIRY CARD →

What can lemon juice do for breaded shrimp?

It prevents loss from black spot while shrimp awaits processing. A lemon juice dip (1 part Exchange Concentrated Lemon Juice to 40 parts water) retards darkening enzymatic action, bacterial growth and fishy flavor development. Lemon juice in breading batter helps reduce bacteria count, freshens the shrimp by dissolving out any accumulated trimethylamine, and improves the flavor.

For canned soups?

Exchange Concentrated Lemon Juice helps improve flavor. Used below the threshold of lemon taste, it enhances characteristic flavors of a wide variety of soups—including cream of mushroom, cream of tomato, vegetable-beef pepper pot and bouillon—without imparting any detectable lemon character.

For your product?

Send us the coupon today—and let our researchers tell you what lemon juice can do for you.

Sunkist Growers

Products Sales Dept., 720 E. Sunkist St., Ontario, Calif.

GENTLEMEN: *Our product is* _____

_____ *How can lemon juice help?*

NAME _____

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CITY _____ ZONE _____

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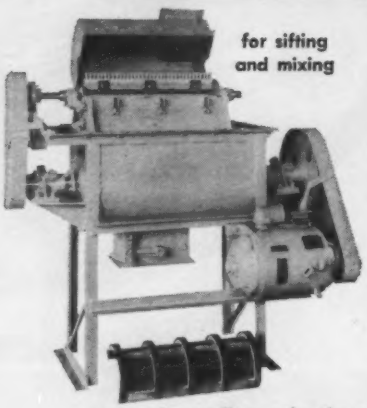
Exchange

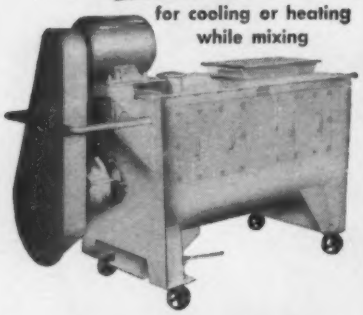
have a special **MIXING PROBLEM?**

SPROUT-WALDRON
ADAPTIONEERED® MIXERS
offer you
the right kind, the right size, the right style

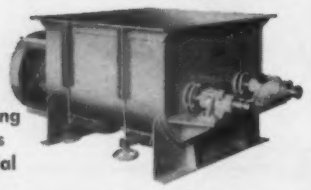
and your **SOLUTION!**



for sifting and mixing



for cooling or heating while mixing



for handling viscous material

These three units are typical of many special mixers built with Sprout-Waldron Adaptioneering. Whether your mixing needs are standard or special—*check with Sprout-Waldron for economy and efficiency.* Ask for Bulletin 148.

623

SW SINCE 1866 **SPROUT-WALDRON**
Muncy, Pennsylvania

Size Reduction • Size Classification • Mixing
Bulk Materials Handling • Pelleting

Useful New Books

Improved Management

MANAGERIAL PERFORMANCE STANDARDS *by Virgil K. Rowland. American Management Assn., 1515 Broadway, NYC 36. 1960. 192p. Price: $5.25, (AMA members) $3.50.*

This newest in the AMA Handbook series deals with a challenging concept — Setting Standards for Executive Performance. In approaching this problem, the author focuses on the relationship between manager and his subordinates as well with his superiors. Attempting to define and achieve better management, this book describes a technique for setting standards using the pattern of standard setting in the traditional business areas of cost, quality, and production.

To show how the process works, a step-by-step plan is provided. Actual transcripts of standard setting sessions are analyzed and every level of management is discussed—first-line, middle, and top.

Labor Study

BLUE COLLAR MAN *by Theodore V. Purcell. Harvard University Press, Cambridge 38, Mass. 1960. Price: $6.*

Compiled from ten years of research, this book explores the attitude and behavior of the American packing-house worker toward his union and his company.

Comparing the operations of Swift & Co. in three different cities and in relation to three national unions in the meat-packing industry, it reveals a repeated phenomenon of importance in the field of labor relations: the worker's dual allegiance to both union and management.

Food Analysis

OFFICIAL METHODS OF ANALYSIS *ed. by William Horowitz, Association of Official Agricultural Chemists, Box 540, Benjamin Franklin Station, Washington 4, D. C. 1960. 832p. Price: $17.50.*

In this 9th edition, the AOAC revises the methods and scope of its 8th edition published in '55.

A new format and typographical treatment improves readability of this latest volume which expands into the fields of fertilizers, pesticides, flavors, pesticide residues, drugs, and nutritional adjuncts. Major chapters report on baking powders, beverages, cereal foods, coffee and tea, dairy products, eggs, fish, fruits, meat, and flavoring extracts.

Standardized methods contained herein are used by governmental regulatory agencies, regulated industries, and by research workers in agriculture.

Food Composition

THE COMPOSITION OF FOODS *by R. A. McCance and E. M. Widdowson. Her Majesty's Stationery Office, Atlantic House, Holborn Viaduct, London, E.C.1. 1960.*

Report provides tables showing amounts of caloric and body building constituents and the minerals in the great majority of foods commonly eaten in Britain. Foods have been analyzed, not only in the raw state, but also as prepared for consumption.

Two important sections are included, one giving the vitamins in foods, and the other the amino-acids composition of the main protein foods — cereals, meat, fish, eggs, milk and its products, and of a limited number of nuts and vegetables. Reference is also made to the effects of cooking.

Booklets & Reports

CHANGES IN TRADE RESTRICTIONS BETWEEN CANADA & THE U. S. *National Planning Assn., 1606 New Hampshire Ave., Washington 9, D. C. 65p. Price: $2.00.* Explores various aspects of Canada-American trade relations based on present and future circumstances.

WATER ABSORPTION BY EVISCERATED BROILERS DURING WASHING AND CHILLING. *Marketing Research Report #438, Office of Information, USDA, Washington 25, D. C.* Covers a study of water absorption and retention by eviscerated broilers chilled in tanks for 2, 4, and 24 hours.

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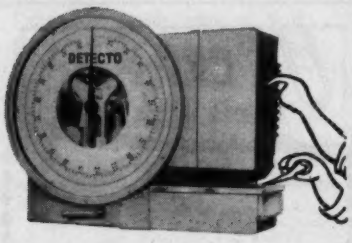

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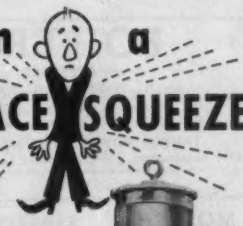

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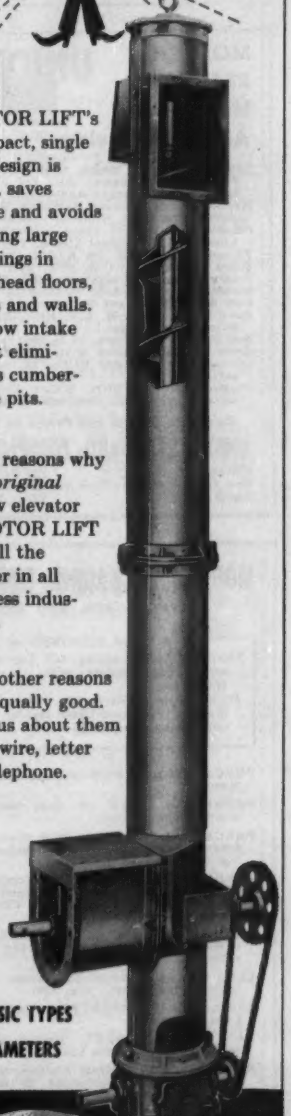

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Sharper Additive Check, June 1960.

Weighing Makes Big Strides by John V. Ziemba, March 1960.

Broad-Gage Supervisor Training Boosts Selling 5 Ways by T. C. Taylor, September 1958.

Selling Approach: Key to Winning Shelf Space in the Chains by C. R. Havighorst, March 1958.

Putting the Sweet Smell of Success into Sales Promotions by Jerry Keefe, January 1960.

Packaging Check List, July 1957.

How to Build Facts into Profits by Thayer C. Taylor, March 1960.

Food Colorimetry; Key to Quality Control by Gideon E. Livingston, March and April 1959.

How to Clinch Vital Particle-Size Control by Robert H. Berg and George M. Kovac, May 1960.

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